NON-TIMBER FOREST PRODUCTS IN WEST BENGAL: KNOWLEDGE, LIVELIHOODS AND POLICY

SOMNATH GHOSAL

BA (Hons.), MA, MSc

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To the God almighty

Abstract

The theme of this research is the conservation of open dry-deciduous forest areas of West Bengal, India, through the socio-economic progress of forest dwellers. The use of Non-Timber Forest Products (NTFPs) is manifold in the livelihood of this area. Systematic and sustainable harvesting of NTFPs could improve the standard of living of forest dwellers and play an important role in the conservation of forest ecosystems.

The research was conducted in Purulia, Bankura and West Midnapur districts, in the south-western part of West Bengal, India. Firewood is the main source of fuel for the forest fringe dwellers of these three districts. Due to the high demand firewood harvesting is an important occupation for a large number of forest communities. The incessant collection of firewood is adversely affecting forest cover and the type and quality of plant species. In this circumstance, sustainable and systematic harvesting of NTFPs can play a potential role in creating job opportunities for forest dwellers. The enhancement of organised NTFP marketing channels could improve the economy and thus reduce the major dependence on firewood. Therefore, the aim of the thesis is to examine NTFPs-based economic development of forest fringe dwellers and to protect the forest cover.

The thesis starts with a brief introduction to NTFPs and its present importance in forest livelihoods in India (with reference to West Bengal) and in international context, highlighting work by geographers, forest researchers, economists and sociologists who are becoming more interested on NTFPs and forest livelihoods from their respective disciplinary perspectives.

To have an idea about NTFPs based forest livelihood of West Bengal, it is necessary to study the geo-physical features of the State and the study area. This will reveal the reasons why this area has been selected for this research. A variety of complementary sources and methodologies were used for the collection and analysis of data and information. Detailed archival research at the British Library, London provides insight into the pre-colonial and colonial NTFP-based forest livelihoods of the Presidency of Bengal.

An exploration of the socio-cultural characteristics of forest communities through interviews and surveys helped to reveal the use and importance of NTFPs. After collection of NTFPs, it is necessary to store those products for gradation and value-addition. The research reveals that the organised markets are quite away from forest villages. Therefore, the knowledge of systematic and sustainable collection and storage of NTFPs needs to be enhanced at the grassroots level.

After the collection and processing of NTFPs, the most important thing is marketing. Through the organised marketing system, forest dwellers can earn more money selling the same amount of products. It was discovered that a large number of intermediaries are involved in the NTFPs business and these intermediaries often try to purchase NTFPs from actual collectors at a very low price and then sell them at a high price. The reasons for the presence of middlemen and how the formal marketing channels can be stronger than the present informal channels were all revealed to be important issues which bolster the formal marketing channels, in which actual collectors might earn reasonable price for their collected NTFPs. It is argued that the efficient and sustainable harvesting of NTFPs can promote opportunities for marginal forest dwellers of these three districts. The increasing production of value-added products from different NTFPs can improve the economic status of these forest dwellers and will reduce rampant demolition of forest resources. The socio-economic improvement can also shift forest dwellers to other professions, which will reduce the dependency on forestry and subsequently it will help to promote the dry-deciduous forest ecology.

Therefore, the research begins with an investigation of historical perspective of human-forest interactions in the Presidency of Bengal and subsequently explores the contemporary forest-based livelihoods of the socio-economically deprived forest fringe dwellers in the dry-deciduous forest areas of West Bengal. The research draws on interdisciplinary areas including historical geography with reference of indigenous knowledge regarding forest products, development geography of the forest-based livelihoods and economic geography of the systematic and sustainable harvesting of NTFPs for the enhancement of formal marketing channels. The study demonstrates that there is a need for intensive research at the grassroots level that will address all the aspects of NTFPs and forest livelihoods, before devising any precise NTFP policy to improve the status of forest livelihoods through the sustainable harvesting of forest products.

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List of abbreviations

Sl No	Abbreviation	Forename
1	ADFO	Additional Divisional Forest Officer
2	AGE	Applied General Equilibrium
3	AISS	All India Soil Survey and Land Use
4	CCF	Chief Conservator of Forest
5	CIFOR	Centre for International Forestry Research
6	CKR	Community Knowledge Register
7	CWDS	Centre for Women's Development Studies
8	DFO	Divisional Forest Officer
9	DSIR	Department of Science and Industrial Research
10	FAO	Food and Agriculture Organization
11	FDP	Forest Dynamic Plots
12	FPC	Forest Protection Committee
13	FSI	Forest Survey of India
14	FTC	Forest Training Centre
15	GIS	Geographical Information System
16	Hh	Household
17	IBRAD	Indian Institute of Bio-Social Research and Development
18	JFM	Joint Forest Management
19	LAMPS	Large Sized Multipurpose Co-operative Societies
20	MFP	Minor Forest Products/Produces
21	MOA	Ministry of Agriculture
22	NABARD	National Bank for Agriculture and Rural Development
23	NAEB	National Afforestaion & Eco-Development Board
24	NBMP	National Board of Medicinal Plant
25	NBSSLUP	National Bureau of Soil Survey and Land Use Planning
26	NGO	Non-Governmental Organisation
27	NTFPs	Non-Timber Forest Products
28	NWDB	National Wasteland Development Board
29	NWFPs	Non-Wood Forest Products
30	OBC	Other Backward Class
31	PCCF	Principal Chief Conservator of Forests
32	PF	Protected Forest
33	RCDC	Regional Centre for Development Cooperation
34	RF	Reserved Forest
35	SMFE	Small and Medium Forest Enterprise
36	UF	Unclassed State Forest
37	WBFDC	West Bengal Forest Development Corporation
38	WBTDCC	West Bengal Tribal Development Cooperative Corp[oration Ltd
39	WEBCON	West Bengal Consultancy Organisation Ltd

Chapter 1

Introduction

1.1 Introduction

The theme of this research is an investigation of the management of non-timber forest products (NTFPs) by forest fringe dwellers living in dry-deciduous forests of West Bengal in India. It also considers how such products may be managed more systematically to benefit those who collect them and to promote sustainable forest management. In this chapter, a definition of NTFPs will be given and their importance will be outlined in terms of how improved knowledge of NTFPs and forest livelihoods would be useful for the future conservation of forest ecosystems. In addition, the aims and objectives of the research will be discussed.

1.2 Defining NTFPs

NTFPs have been defined as "…all biological materials, other than timber, which are extracted from forests for human use" (NTFP Exchange Programme Website 2007). They include fruits, resins, gums, herbal plants, roots, honey and wood that is not timber (for example, firewood). In this thesis, firewood has been considered as an NTFP. According to Shvidenko *et al.* (2005),

> "Non-wood forest products [are] defined as goods of biological origin other than wood, derived from forests, other wooded land, and trees outside the forests (FAO 1999b) … they can be classified in a number of broad categories according to their end use: edible products; fodder for domestic animals; medicines; perfumes and cosmetics; colorants; ornamentals; utensils, handicrafts, and construction materials; and exudates like gums, resins, and latex. Overall, they play an important role in the daily life and well-being of hundreds of millions of people worldwide as well as in the national economies of many countries." (Shvidenko *et al.*, 2005, p. 605)

The type, number and nature of NTFPs vary from one geographical area to another based on the local geo-physical conditions. Considering the socio-cultural importance of NTFPs in forest livelihoods, Wickens (1991) believes that NTFPs are:

> "… all the biological material (other than industrial round-wood and derived sawn timber, wood chips, wood-based panels and pulp) that may be extracted from natural

> ecosystems, managed plantations, etc. and be utilized within the household, be marketed, or have social, cultural or religious significance. Thus, non-timber forest products include plants used for food, fodder, fuel, medicine, fibres, biochemical, etc …" (Wickens, 1991, p. 4)

Due to the increasing economic value of NTFPs, people from different sectors (such as environmentalists, economists and sociologists) are becoming more interested in these products. The current estimated total value in world trade of NTFPs is approximately US $1.1 billion (Wilkinson and Elevitch, 2000) and the market has grown by nearly 20% annually over the last twenty years (Hammett, 1999). NTFPs have potential as a menas of generating forest-based economic development. Sustainable management of forest products other than timber can create full or part-time employment opportunities for people living in or near forest areas. As the sustainable management of these products can increase employment opportunities, governments (particularly those of the Global South) are placing special emphasis on it (Corbridge and Kumar, 2002). In 1998, the Centre for International Forestry Research (CIFOR) began a major global study to provide information about NTFPs and their relations to land use and local livelihood strategies (http://www.cifor.cgiar.org/; accessed on 7th of October 2007). Presently, this organisation is focusing on the commercialisation of NTFPs, in an environment friendly manner, for the economic development of forest dwellers.

NTFPs have great importance to the livelihoods of forest [tribal] dwellers, especially those living in the dry-deciduous forests of eastern India where the greatest number of NTFPs are found. Mainly tribal women collect NTFPs for subsistence as well as commercial purposes. For example in Orissa, 1.8 million women collect around 45000 tonnes of kendu leaves each year, which are used as the raw material for the *Bidi* (a sort of cigarette) industry. NTFP collection creates about 1062.7 million person days of employment all over India (Khare and Rao, 1993). Organised and systematic collections of NTFPs improve the livelihoods of forest people. It is, however, true that the cash income from NTFPs varies from time to time, from place to place and from one forest to another (Mahapatra *et al.*, 2005). In West Bengal (India), the Centre for Women's Development Studies (CWDS) has helped to establish a network of village women's societies that are involved in a range of forest and wasteland based income-generating activities (http://www.cwds.org/; cited on 19th of December 2007).

Tribal forest communities are the main collectors of NTFPs in India. It is labour intensive work and about half of the income of tribal people, living in or around forest areas, comes from NTFPs (Singh and Ardey, 2003). Around 3000 types of NTFPs are found all over India (Non-Timber Forest Products Exchange Programme, 2007). The socio-economic value of NTFPs can be beneficial in keeping intact the ecological balance of Indian forests (Yadav and Roy,

1991). For instance, many NTFP species have great importance in the socio-cultural lives of forest people. The flowers and leaves of the Sal tree, for example, play a major part in the Sarul and Baha festivals celebrated in March and April (Jewitt, 2002). To ensure the continued supply of NTFPs, forest dwellers take special care of these species. Therefore, with the survival of these plants species, their associates also continue to exist and simultaneously the forest ecology remains intact.

In eastern India (where a high proportion of forest dwellers still live), the main source of NTFPs are open dry-deciduous forest areas (including protected and unclassed state forests). Mainly leaves, flowers and seeds are collected from there. The following table shows the most popular NTFPs of this region sold for cash income purposes.

Table 1.1: NTFPs of Eastern India sold for income generation

1. Fruit	Ber (*Zizyphus sp.*), Imli (*Tamarindus indica*), Jackfruit (*Atropha gossyphifolia*), Uruguna (*Cycas circinalis*), Mango (*Mangifera indica*)
2. Flower	Mahua (*Madhuca latifolia*), Kainar (*Bauhinla purpurea*), Giliri (*Indigofera cassioides*)
3. Oilseed	Karanj (*Pongamia pinnata*), Mahua (*Madhuca latifolia*), Sal (*Shorea robusta*), Chironji (*Buchnaina lanzan*), Kusum (*Schleichera oleorosa*)
4. Leaves	Sal (*Shorea robusta*), Tendu/Kendu *(Diospyros melanoxylon*), Siall (*Bauhinia vahlii*)
5. Tanning and Gums	Harida (*Terminalia chebula*), Bahera (*Terminalia bellerica*), Genduli (*Sterculia urens*), Babul (*Acacia nilotica*), Karaya (*Anogelssus latifolla*), Salai (*Boswellia serata*)
6. Grass and Fibres	Khajur (*Phoenix sylvestris*), Jhadu (*Thysalonea argostis*), Bena root (*Eulaliopsis binata*)
7. Wild vegetables and tubers	Pitalu (*Dioscorea alata*), Kasalu Panialu (*Dioscorea sp.*), Masia kanda (*Dioscorea wallichi*), Mushroom (*Lycoperdon sp.*), Kankad (*Momordia dioica*), Bamboo shoot (*Bamboosa tulda*)
8. Insect products	Tassar (*Anthraea myllita*), Lac (*Laccifer lacca*)

Source: Mahapatra *et al.*, 2005, p. 261

From the dry deciduous forests of eastern India, flowers, fruits and seeds are mainly collected during the summer and spring. Leaves are collected throughout the year. Mainly tribal women and children collect these NTFPs. During the monsoon, when the collection of NTFPs is very limited, most of the tribal or forest people migrate from their villages in search of work as farm or wage labourers. Therefore, the income from NTFPs varies from one season to another (Mahapatra *et al.*, 2005).

According to Cavendish (2000), only systematic and subsistence collections of NTFPs could develop the livelihoods of forest communities and the forest environment in the Global South. If forest people get back their full right to use NTFPs for subsistence purposes and the India Forest Department guides them in sustainable harvesting practices, then it may be possible to improve the standard of living of forest dwellers (Viet Quang and Nam Anh, 2006). Forest dwellers (mainly tribal) can benefit financially from selling NTFPs on the open market as raw materials for different industrial products or as the final product with added value (Sarker and Das, 2009).

1.3 Aim and objectives of the research

The aim of this research is to investigate the socio-economic status of forest livelihoods based on NTFPs and how the systematic use of NTFPs could help to protect open dry-deciduous forest areas (including Protected Forests (PF) and Unclassed State Forest (UF)) of West Bengal. The conservation of the dry-deciduous forest areas of West Bengal is closely linked to the fulfilment of forest dwellers' basic needs in the longer term (Mahapatra and Tewari, 2005; Jewitt, 2002a). The main questions framing the research are outlined below:

1. What types of NTFPs are available in the protected forests or unclassed state forests of West Bengal, where a high number of forest communities are living?
2. How are forest livelihoods and culture dependent on locally available NTFPs and how have traditional knowledges and practices regarding the use of NTFPs changed in recent years?
3. What is the status of collection and conservation of NTFPs for commercial as well as household purposes at the community level?

In order to address the above questions, a comparative study has been carried out on the marketing of NTFPs between formal and informal (legal and illegal) sectors in the dry-deciduous forest areas of West Bengal. It is hoped that the results of this study might form the basis for policy recommendations regarding NTFP exploitation and management in eastern India.

Finally, government policy regarding the collection, storage and marketing of NTFPs and its impacts on forest dwellers' livelihoods will be discussed in the context of the present scenario of West Bengal. Questions relating to what forest people think about the contemporary forest and NTFPs policy, how this policy is affecting their livelihoods and what improvements could be made will all be addressed in this research. It is argued that improved knowledge about

the contemporary features of NTFP harvesting, marketing and their role in forest livelihoods will be beneficial in creating and implementing the State's future policy for the conservation of open dry-deciduous forests and the improvement of forest-based livelihoods.

Although there is an important role for NTFPs in the livelihoods of forest communities from the dry-deciduous forest areas of West Bengal, very little research work has been done in the research area. Sarker and Das (2009), Malhotra (1991 and 1993), Saxena (2003) and Mahapatra and Mitchell (1997) have carried out research on the economic and social importance of NTFPs on the forest livelihoods in east Indian deciduous forest areas of Orissa, West Bengal, Bihar and Jharkhand. However, the forest livelihoods and NTFPs of the dry-deciduous forest of West Bengal have received little attention to date.

Chapter 2

Literature review

2.1 Introduction

In the first part of this chapter, the importance of NTFPs will be discussed in a global context. Discussions will include the types and nature of NTFPs worldwide, how they relate to forest livelihoods for domestic as well as commercial purposes and how systematic harvesting of NTFPs could be useful for the implementation of forest conservation policy. The second part of the chapter will address these topics in the Indian, and more specifically West Bengal context.

2.2 Geography of NTFPs in the international context

A large amount of research has already been completed on the protection and development of forest and forest products from all over the world focusing on different aspects of forest livelihoods (Bürgi, 1999; Jodha, 1990; Byron and Arnold, 1999; Chun-Lin *et al.*, 1999; Torras, 2000). The environmental, economic and socio-cultural importance of forests have long attracted environmentalists, economists and social scientists (Keeling and Phillips, 2007; Kerr, 1991; Khare and Rao, 1993). Shvidenko *et al.* (2005), for example, have conducted rigorous work on the market and non-market economic importance of world forests. They explained:

> "Forests annually provide over 3.3 billion cubic meters of wood (including 1.8 billion cubic meters of fuel wood and charcoal), as well as numerous non-wood forest products that play a significant role in the economic life of hundreds of millions of people. The combined economic value of ''nonmarket'' (social and ecological) forest services may exceed the recorded market value of timber, but these values are rarely taken into account in forest management decisions." (Shvidenko *et al.*, 2005, p. 587)

Out of a total of 800 million hectares of protected [or reserved] forest areas, most are located in developing countries within the tropics (Gunatilake, 1998). These tropical forest areas "… may be among the areas containing the greatest wealth of 'non-market' benefits" in the world (Torras, 2000, p. 285). A considerable area of this tropical forest has disappeared within the last few decades. Unplanned collection of (precious) timber for several purposes was the main reason for the massive deforestation in the tropics (Mendelsohn, 1994; Torras, 2000).

> "… the rate of tropical deforestation has reached an historic high in the post World War ll development boom. In the Amazon alone, the area deforested since World War ll reached the size of France by 1980." (Mendelsohn, 1994, p. 750)

Like other tropical countries of South Asia, the same thing has been happening in Indian woodlands.

> "In a seminal study of dry land plain areas in several Indian states, Jodha (1990) found that the area of common pool land available to villagers as a source of forest products had declined by margins ranging from 31% to 55% in the 30 years after 1951." (Jodha, 1990, cited in Byron and Arnold, 1999, p. 795)

Although the deforestation of tropical forests has been happening at a fast rate for economic development purposes, it is not clear to environmentalists or economists how much deforestation has contributed to social progress to date. For the sake of different socio-economic activities how much clearance of tropical forests should be allowed is a vital question to contemporary environmentalists as well as economists.

Mendelsohn (1994), however, possesses a different idea on the conversion of forest areas into non-forest land. To him,

> "Deforestation can be efficient. For example, the deforestation which occurred in the temperate zone over the last two centuries converted an over-matured forested ecosystem into a much more productive landscape. With the rising demand for agricultural land, tropical deforestation could also be viewed as an adjustment process whereby tropical countries are moving from natural forests to more productive landscapes." (Mendelsohn, 1994, p. 750)

It is, however, true that deforestation will not continue. Mendelsohn (1994, p. 756) thinks, it will be stopped "… when the remaining forests are more valuable than alternative uses, as is clear in the history of temperate forests in Europe and North America". Using models, he has also explained, how 'property rights' can affect the tropical forests. The use of a well-defined property rights model might be useful in the protection and conservation of tropical forests and forest products as well as to make deforestation more 'constructive'.

Previously, timber used to be considered as the most important product of tropical forest. It is, however, now clear that the value of the tropical forest extend beyond timber. The market value of the NTFPs, produced in tropical forests each year, is much more than that of the timber products. "Moreover, the total net revenues generated by the sustainable exploitation

of 'minor' forest products are two to three times higher than those resulting from forest conversion" (Peters *et al.*, 1989, p. 655).

2.2.1 NTFPs and the conservation of forest ecosystem

Collection of NTFPs causes less damage to forests compared to timber operations. Unfortunately, NTFPs have come into focus only in the last half of the 20th century.

> "Interest in NTFPs began in earnest in the late 1980s and the early 1990s, in conjunction with increasing global concern about environmental issues, especially deforestation, with increased attention to rural poverty, and with the emergence of the concept of "sustainable development"." (Belcher *et al.*, 2005, p. 1436)

The amount and type of NTFPs, however, have been reducing continuously all over the world (Byron and Arnold, 1999). This is due to the transformation of forest areas for alternative uses, the over exploitation of timber products and the development of transport networks in inaccessible areas of Africa, Asia and South America. The indiscriminate harvesting of timber reduces forest cover and, at the same time, many more plant species, which produce NTFPs, are disappearing. Simultaneously, the quantity and quality of NTFPs is adversely affected. This is particularly true for the highly populated developing world, where a large number of people still live within the vicinity of forest areas and depend on forest products.

The type, nature and number of NTFPs varies from one forest area to another, even in the same type of forest areas of different regions or in different parts of the same region based on the local geo-physical environment. Tropical forest is quite famous for its diversity of plants and animal species. To analyse the diversity of tree species of tropical forests, Forest Dynamic Plots[1] (FDP) network theory has been widely used in recent years (Burslem *et al.*, 2001). The diverse tree species of tropical forests produce several types of NTFPs. According to Burslem *et al.* (2001), "the tropical forests of the world support a huge number of tree species – more tree species are found in 0.5 km² of some tropical forests than in all of North America or Europe" (Burslem *et al.*, 2001, p. 606).

Bürgi (1999) has divided the history of forest use and management into three phases: the 'period of traditional multiple use' (until mid 19th century); the 'period of primacy of timber production' (from mid 19th to mid 20th century) and the 'period of modern multi-impact

[1] Forest Dynamic Plot (FDP) – Number of plant species per unit of forest area.

management' (from mid 20th century to date). For the analysis of these three phase-changes, he had focused on human-forest relationships in Swiss lowland forest areas. How human needs from the local forest areas affect the forest ecosystem was the main theme of his research. Human needs include timber as well as NTFPs. The demand and collection of timber and NTFPs varied from one phase to another (Bürgi, 1999). During the first phase the value of timber and NTFPs were similar, in the middle phase the value of NTFPs were underestimated compared to timber products, whereas, in the third phase, presently, NTFPs are considered as more valuable than the timber products from the perspective of forest ecosystems management as well as forest dwellers' socio-economic enhancement. The changes in human needs are the main causes of this shift.

During the implementation of an FAO/UNDP project in the South Pacific region, Olsson (1991) focused on the multipurpose uses of NTFPs by forest dwellers living in the Republic of Vanuatu and how the proper harvesting of NTFPs can save the forest ecosystem in the long run. There are several socio-cultural practices performed by forest dwellers to protect plant species that produce NTFPs. Ultimately, these practices help to protect the forest cover of the country. The development of forest areas, the sustainable uses of NTFPs and the implementation of traditional practices of forest products management was the main focus of this research.

2.2.2 NTFPs and the forest livelihoods

Before discussing the relationships between forest and forest people, it is necessary to identify who the forest people are, to what extent they are related to the forest and what their location is, in context of the forest. There are three main reasons why tropical forest people depend on forest products. First of all, the collection of forest products can be an 'attractive' job for them; secondly, it could be the only option and the only way to struggle with poverty; and finally, forest people follow these activities due to 'strong cultural or spiritual reasons' (Byron and Arnold, 1999, p. 789-790).

NTFPs are collected by forest dwellers, living within or outside forest areas, for household as well as commercial purposes. Around 400 million people directly and more than 1 billion people indirectly depend on NTFPs throughout the world (Sampson, 2005; Turner, 2001). In Africa, forest people collect NTFPs for food, fuel, medicines, decorative, construction materials, fodder, industrial raw materials etc. In Sierra Leone, for example, about 14% of foodstuffs and 32% of medicines are produced from NTFPs. About 10% of rural people in Ghana collect NTFPs on a regular basis for their cash income purposes. In Sub-Saharan

Africa about 15 million people (15% of rural households) are involved in NTFP collection for cash income purposes only (Byron and Arnold, 1999).

The age-old practices of NTFP harvesting by indigenous forest people have been changing dramatically all over the world due to commercialisation (Shvidenko *et al.*, 2005; Sampson, 2005; Turner, 2001).

> "At least 150 Non-Wood Forest Products (NWFPs) are of major significance in international trade, and the annual export value of these products was estimated at $11 billion in 1994. China is the leading exporter of NWFPs, followed by India, Indonesia, Viet Nam, Malaysia, the Philippines, and Thailand (Iqbal, 1995). … The most reliable estimates indicate that from 200 million to 300 million people earn much of their subsistence income from non-industrial forest products (Byron, 1997)." (Shvidenko *et al.*, 2005, p. 605)

The actual number of available NTFPs is much more than the number recorded in official statistics. This is especially true for the tropical developing or underdeveloped countries. Those NTFPs, which are exported to other states or countries or have considerable economic value and are more widely collected are usually considered to be the available NTFPs of that particular area. It is these NTFPs, which are marketed in an organised way and for which governments obtain a significant amount of revenue, which appear in official statistics. Indigenous forest people know about many more NTFPs, which they use for socio-cultural and economic purposes (often involving illegal marketing of NTFPs). In the 'Millennium Ecosystem Assessment' report, Shvidenko *et al.* (2005) explained that:

> "Global estimates of the total monetary value of Non-Wood Forest Products (NWFPs) are very approximate and express an order of magnitude rather than documented market prices, particularly for subsistence uses. A number of studies (Myers 1997; Myers, 1988; UN-CSD/IPF-CSD 1996; Michie *et al.* 1999) have attempted to estimate the value of the subsistence use of NWFPs, arriving at figures ranging from $90 billion to $120–150 billion. This aggregate figure includes valuation of fodder and grazing ($40–50 billion); edible products ($20–25 billion); traditional medicines derived from plants, insects, and animals ($35–40 billion); and non-wood construction materials, such as thatch grass and bamboo, and other similar items ($25–35 billion)". (Shvidenko *et al.*, 2005, p. 605)

It is, however, quite difficult to analyse the importance of NTFPs for forest livelihoods from a general perspective. The relationship between forest people and NTFPs varies with the

nature of the forest, the forest products and the surrounding socio-physical surroundings. It also differs with "… the wide variation in needs and use of forest outputs between richer and poorer within a [forest] community, and within a household between men and women, and even between age groups" (Byron and Arnold, 1999, p. 796).

> "… if we are to arrive at meaningful estimates of the importance of forests and forest products to people in their vicinity, we need to focus on measures that reflect the diversity of situations that exists, and the fact that for most this importance is best expressed in qualitative rather than quantitative terms." (Byron and Arnold, 1999, p. 793)

Existing research has revealed little from the perspective of conservation of forest and forest products and the impact of NTFPs in forest livelihoods. Focusing on the development of forest dependency models[2] (Illukpitiya, 2005), Gunatilake (1998) said,

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[2] Forest Dependency Model (FDM) - The model can be mathematically represented as:
$Y_f = \beta_0+\beta_1(Effi_i)+ \beta_2(Edu_i)+ \beta_3(Oinc_i)+ \beta_4(Flabor_i)+ \beta_5(Know_i)+ \beta_6(MFratio_i)+ \beta_7(Wealth_i)+ \beta_8(Diver_i)+ \beta_9(Dis_i)+\varepsilon_i$
Where:
Y_f = income generate from extraction of forest resources
iEffi = technical efficiency in farming
iEdu = formal education measured by number of years
iOinc = off-farm income
iFlabor = family labour measured in number of productive members in the family
iKnow = accumulated forest knowledge (experience)
iMFratio = male to female ratio
iWealth = household wealth measured by the value of the selected goods (i.e livestock, tractors, bicycles, radios, equipments used with animals)
iDiver = diversification index
iDis = distance to forest from home
iβ's are unknown parameters to be estimated

iε is the error term

The variable associated with diversification can be constructed by the inverse Simpson index of diversity (Hill, 1973).

Index of diversity = = $1/\sum_{i=1}^{N} P_i^2$

Where:
N = number of different income sources
P_i = household income generated by activity *i*

'Hypothetical Scenario Associated with the Forest Dependency Model' –
Efficiency in farming, educational qualification, increase of wealth, off-farm income, diversification of household income, distance to the forest and availability of credit for farming are inversely related with the dependency on forest products collection; whereas, availability of labour, knowledge on forest and forest products, agricultural risk are positively related with the dependency on forest products collection. The relationship between gender allocation and forest products collection is 'ambiguous'.
Source: ILLUKPITIYA, 2005, p. 11-14

> "Theory and empirical evidence on the socio-economic factors influencing forest dependency have drawn little attention in social science literature in the past. Therefore, there is limited prior knowledge on socio-economic determinants of forest dependency and the nature of their impacts. … there is no single study that provides theoretical relationships between forest dependency and socio-economic variables …" (Gunatilake, 1998, p. 275)

It is clear that the forest is much more than just a source of timber. It has great value in preserving the geo-physical environment, controlling soil erosion and land degradation, maintaining water-bodies and meteorological conditions. A distinct type of ecosystem, with human-nature cohabitation, is found there. Forests also provide several types of NTFPs, used for generating energy, food, raw materials and medicine. Therefore it is quite difficult to weigh up the economic significance of the forest area. Presently, the most important issue for environmentalists, economists and sociologists is to find out the value of forest and forest products to forest people. A rigorous study on forest and forest people relationships can help to formulate suitable forest and forest products conservation policy.

2.2.3 NTFPs and the forest socio-cultural life

Byron and Arnold's (1999) extensive research on the importance of NTFPs on forest peoples' cultural, social and economic life in tropical forests, sought to produce data and information on the contemporary features of demand, supply and use of NTFPs to support forest people. They also performed a detailed study on the identification, location and dependence of forest people living in or around tropical forests and the relationship between tropical forests and forest people how might change with time in the perspective of the surrounding socio-physical environment. The research was targeted on the protection of tropical forests by the forest people.

Tropical forests are often intimately related, spiritually as well as culturally, to the forest peoples' livelihoods. More than 1 billion [especially forest] people all over the world depend on NTFPs for their daily household needs including social as well as cultural purposes (Turner, 2001).

> "In all, over 500 plant and fungus species are known to have specific cultural applications among aboriginal peoples of north-western North America, and most of these are forest species. Products from some of these species are already being marketed. … In British Columbia in 1997, the 200-300 commercial gatherers of

> medicinal plants collectively earned an estimated $2-3 million Canadian." (Turner, 2001, p. 66)

The cultural value of NTFPs is something that aboriginal people have great regard for, but is often neglected by outsiders (Turner, 2001). The present overexploitation and the lack of knowledge on the appropriate uses of NTFPs by outsiders has been hampered the sustainability of forest ecosystems. Therefore, forest people in British Columbia (Canada) are very worried about the commercialisation of NTFPs as the value of NTFPs is something more than of economic importance only to them.

The social values of Specialty Forest Products (SFP or NTFPs) and how 'large scale commercialisation' of these products is having an adverse effect on rural livelihoods of North America was the theme of Emery's (1998) work. For this, he has divided the social values of SFP (NTFPs) into three categories: 'livelihood', 'cultural' and 'recreational'. According to him,

> "Livelihood values are derived from both non-market and market uses. Cultural values include the continued ability to observe special practices and transfer knowledge from one generation to another. Recreational values combine the peace and pleasure of being outdoors with a practical and useful activity." (Emery, 1998, p. 25)

However, Steinberg (1998) has found during his research among the Mopan Maya of southern Belize, that indigenous agro-forestry practices are changing with cultural changes at the grassroots level. This is also reducing the diversity of the 'biological landscape'.

Among the Yucatec Maya of Mexico, the practices of shifting cultivation diminished the local forest areas and simultaneously reduced the quantity and quality of NTFPs (Pulido and Caballero, 2006). On the one hand, the systematic harvesting of NTFPs can help to preserve forest areas and, at the same time, can also help to reduce rural poverty. With the increase of 'anthropogenic effects' in tropical forests, the total forest area as well as the quantity and quality of forest products is dwindling. The main theme of the work of Pulido and Caballero (2006) was to analyse the transformation of tropical forest areas in shifting cultivation landscapes and its effect on NTFPs produced in those forest areas.

During their research on the economic importance of rain forests in Bolivia and Honduras, Godoy *et al.* (2002) considered the financial value of forest products for household 'consumption' and 'earning'; while, to Aylward and Barbier (1992), the economic importance of tropical forest ecosystems includes their direct, indirect, optional as well as non-use

values. It is quite difficult to measure the significance of tropical forests based only on the economic importance of forest products used for household or commercial purposes. To date, forest researchers have mainly focused on the valuation of forest products from different perspectives, whereas, the relations between forest and forest dwellers have been ignored.

2.2.4 Sustainable harvesting of NTFPs

Indigenous forest dwellers have often developed their own methods for the sustainable harvesting of NTFPs. New methodologies should consider indigenous knowledge carefully regarding the sustainable harvesting of forest products. It might be useful if traditional knowledge and modern scientific methods are combined, particularly when NTFPs are harvested for commercial purposes (Pfund and Robinson, 2005).

> "Any change in the extent and quality of the forest, or in access to traditional forest areas, is likely to be very disruptive for traditional use and activity patterns. Some populations (e.g., in parts of the Amazon basin) have managed to retain predominantly subsistence and self-reliant ways of life. Most, however, are increasingly affected by exposure to market forces. Where this is the case they tend to be highly dependent on middlemen for access to outside markets for sale of their products, and for supplies of outside goods." (Byron and Arnold, 1999, p. 797)

Thousands of plant as well as animal species may disappear within the next few decades if urgent actions are not taken outside the reserved forests (especially in the open forests) of tropical regions regarding the sustainable and systematic harvesting of forest products. Putz *et al.* (2001) have undertaken extensive research on the enhancement of tropical forest biodiversity and what government policy should be on it.

In many developing countries, NTFP collectors or forest people often try to sell these products as quickly as possible to earn some money. Few have sufficient storage facilities to store their collected products. Within India, poor transportation systems from remote forest villages to the nearest market and the lack of information about the market price of NTFPs have created an opportunity for middlemen and mobile agents to involve in the NTFPs business. Actual collectors are frequently exploited by these middlemen and mobile agents.

For the systematic harvesting of NTFPs and to protect the native forest environment, a precise NTFP policy can be very useful so long as sufficient consideration is given to local socio-economic issues and problems. In the eleventh World Forestry Congress (October,

1997; Antalya, Turkey), particular emphasis was given to the formulation of policies for systematic and organised harvesting of NTFPs to preserve the forest cover in tropical over-populated countries. The systematic harvesting of NTFPs can expand the success of participatory forest management strategies. In India, the 'joint forest management circular of 1990' was later modified to systematise NTFP harvesting and combine it with community forest management systems (Chandrasekharan, 1998; Mallik, 2000).

Salisbury (2002) has worked on the sustainable management and efficient use of natural resources, including minor forest products of the Brazilian Amazon forest. The aim of his research was to use local knowledge in combination with modern techniques to control rapid deforestation. He considered GIS techniques to be useful in this regard:

> "Many efforts are underway to integrate local knowledge into natural resource management. One method of including this knowledge into natural resource management is through the use of a GIS combining local and scientific knowledge. A GIS containing spatial, social and biophysical knowledge from local and scientific sources can improve natural resource management by providing ground-truthed *[sic]* base-line data relevant for management and monitoring strategy." (Salisbury, 2002, p. 156)

2.2.5 The commercial importance of NTFPs

Compared to NTFPs, timber had always been considered as the most valuable product because of its uses for construction, making railway sleepers and for naval purposes. Therefore, the market for NTFPs has received significantly less attention until recently. Due to the primary focus on timber products, there was limited information about the revenue brought in by [other minor] forest products. This limited revenue earning capacity caused the degradation of tropical forests for alternative uses. According to Peters *et al.* (1989),

> "Without question, the sustainable exploitation of non-wood forest resources represents the most immediate and profitable method for integrating the use and conservation of Amazonian forests. Why has so little been done to promote the marketing, processing and development of these valuable resources?" (Peters *et al.*, 1989, p. 656)

A significant turn in the use of NTFPs in forest livelihoods is presently noticeable worldwide (Godoy *et al.*, 1995). The markets for NTFPs have expanded dramatically and the

commercial importance of NTFPs has exceeded their cultural and social value. According to Shvidenko *et al.* (2005),

> "Non-Wood Forest Products (NWFPs) [presently] provide subsistence, employment, and income, particularly for the rural poor, and support small, household-based enterprises, especially in developing countries (e.g., Arnold, 1998; Ciesla, 1998). … From 150 million to 200 million people belonging to indigenous groups in over 70 countries, mostly in tropics, depend on NWFPs to sustain their way of life, including their culture and religious traditions (CIDA, 1998)." (Shvidenko *et al.*, 2005, p. 605)

During his work in Indonesian forest areas, Kerr (1991) focused on the traditional uses of NTFPs for the making of handicraft goods by forest people in Indonesia and how these handicraft products can improve the economic condition of forest people. Marketing of NTFP-based handicraft products helps to solve unemployment problems among forest dwellers and to improve their livelihoods without overexploiting the forest resources.

According to Pattanayak and Sills (2001), tropical forests provide 'natural insurance' to forest dwellers. With reference to the Brazilian Amazon, they focused on the economic importance of NTFPs in forest livelihoods. Due to the uncertainty of agricultural work in and around forest areas, local poor people rely on the harvesting of NTFPs to manage shortages of agricultural products. Thus, not only the poorest interior forest dwellers but also forest fringe people, for whom the harvesting of NTFPs is not the primary occupation, place considerable dependence on the collection of NTFPs (Pattanaik and Human, 2000; Pattanayak and Sills, 2001).

> "Where access to forests has been relatively unrestricted, forest foods and income from forest products are often particularly important for poorer groups within the community." (Byron and Arnold, 1999, p. 793)

Like other parts of the world, forest communities from the savannas of South Africa use NTFPs extensively for their household as well as commercial purposes. For cash generation, commercialisation of NTFPs at the village level has been increasing considerably. The money that villagers earn from the selling of NTFPs is used for other household demands as well as to pay fees for education and for medical purposes (Shackleton and Shackleton, 2003; 2006).

The international market for NTFPs, as an industrial raw material, has been expanding at a very fast rate. A significant amount of NTFPs, including medicinal plants, are exported from

Asia, Latin America and Africa to Europe and North America. These NTFPs are used as the raw materials for several industrial products as well as for direct uses.

> "With regard to the location of the processing activities, Germany ranked third worldwide as an importer of medicinal plants and also third as a (re)exporter of processed products … it imported 849 species in 1992 from the temperate Asian region alone (other imports were of 343 species from Africa, 318 from Tropical Asia and 207 from South America), most of which were processed in Germany (Lange and Schippmann, 1997). This shows the potential there is for value addition locally." (Pfund and Robinson, 2005, p. 39)

During his work on South African savannas, Shackleton (2003) focused on the commercialisation of NTFPs as a 'safety net' for better livelihoods at the rural level. Collection and marketing of NTFPs is considered as a form of self-employment.

> "… a lack of employment opportunities rather than poor education and skills has forced these women into selling NTFPs for income … Nevertheless, it is important to recognise that these traders, from amongst the poorest members of society, have managed to secure a living for themselves … They represent a few hundred people who would not have otherwise had a job. For this reason it is important not to underestimate the role that NTFPs can play in easing poverty and providing additional options for income generation or in meeting specific cash needs such as school fees." (Shackleton and Shackleton, 2003, p. 11 & 14)

Shackleton and Shackleton (2003) also talked about the difficulties and main constraints regarding the expansion of NTFPs market. Pfund and Robinson (2005) have revealed too the limitations for marketing of NTFPs at regional as well as international levels and how it affects forest livelihoods in tropical countries. According to them, "NTFP markets are very diverse and generally specialized. They can be international "big business", for instance for some medicinal plants, or they can remain important locally or regionally" (Pfund and Robinson, 2005, p. 38).

2.2.6 The importance of NTFP policy in forest and forest products management

Forest policy varies from one country to another based on the nature of the government of the concerned country (Byron, 1997). From a 'communist command-and-control' system to a 'capitalist' system, clear variances in forest and forest products policy are noticeable. These different policies also affect forest dwellers' livelihoods in different ways. For example, before

the disintegration of the USSR, in the Ukraine forests and other natural resources were controlled through the communist system. After independence from the rule of the Soviet Union (August, 1991), a more capitalist system has been working in the country. This change affected forests and forest products policy as well as forest livelihoods (Nijnik and Van Kooten, 2000).

To evaluate the policies regarding the management of forest and forest resources and for the socio-economic betterment of forest people, Dufournaud *et al.* (2000) used the Applied General Equilibrium[3] (AGE) model (Borges, 1986) in Vietnam. They focused especially on the export ban, increasing royalties and the increase of export tax on forest products. They also examined how the forest is important in Vietnam's economy and what initiatives have been taken by the government to protect forest covers through the systematic harvesting of NTFPs.

During the making of policy for the management and research on NTFPs of a particular forest area, the knowledge of actual [local] harvesters should get utmost priority. During his research in the Upper Peninsula of Michigan, Emery (2001) found most of the actual gatherers possess a fair knowledge about their collected products. He recommended that this knowledge should be used for the making of government policy for the sustainable use of NTFPs as well as for the conservation of forest ecosystems.

Gunatilake (1998) investigated the socio-economic factors affecting forest dwellers and controlling their dependence on forest products, in the context of Knuckles and Sinharaja forest areas of Sri Lanka. He has advised that the "identification of the factors affecting forest dependency is an initial step towards formulating policies and programmes that are aimed at reducing forest dependency" (Gunatilake, 1998, p. 275). To protect forest and forest products for future generations and for the sustainable use of forest products, government policy should be used to reduce the dependence of forest dwellers on forest products.

With reference to Baka village in China, Chun-Lin *et al.* (1999) have shown how changes in 'land-cover', 'land-tenure' and 'market pressure' have affected many of the 'common property management regimes' of Asia in the last few decades. The aim of their research was to

[3] Applied General Equilibrium (AGE) model - "… applied general equilibrium models describe the allocation of resources in a market economy as the result of the interaction of supply and demand, leading to equilibrium prices. Applied general equilibrium models are a powerful and informative tool to deal with important practical policy issues; but they should be developed with great care and used with prudence. … It has generated much interest among policy makers and policy analysts as a new methodology capable of providing coherent answers to complicated questions in a systematic way." (Borges, 1986, p. 8)

reveal the effect of contemporary government policies on the ancient land-use practices regarding the management of natural [forest] resources. They have also focused on the 'commoditisation' of natural resources and its influence on land cover and land use strategies. According to them, "…the most significant factor affecting the collapse of common property systems has been the extension and intensification of state authority which has placed control over rural communities and resources in the hands of government agencies and corporations who lack either the will or the means to manage forests in a sustainable manner" (Chun-Lin *et al.*, 1999, p. 133).

Viet Quang and Nam Anh (2006) have undertaken comprehensive work on the identification of [forest dwellers] 'household characteristics' and their dependency on NTFPs for livelihood and/or cash income purposes for the formulation of forest and NTFPs conservation policies in Vietnam. With the increase of commercial collection of NTFPs, the number and type of NTFP species is decreasing so Viet Quang and Nam Anh argued that forest policy should aim to draw a balance between the maintenance of forest biodiversity and commercial collection of NTFPs. From the perspective of commercial NTFPs harvesting, they focused on the local socio-economic conditions and how these influences NTFP trade from one forest area to another as a guide for drafting recommendations to Vietnam's forest conservation policy.

To protect tropical forests, all the products produced in tropical forests should be identified properly and then their 'relative' values should be calculated. Based on these relative values, approaches should be taken for the preservation and development of individual forests (Myers, 1988). It is, however, quite difficult to use an analogous policy in the Amazon, Congo or south-east Asian tropical forests because of the diverse nature of forests and forest-people relationships, so micro level work is becoming more important for intensive study at the grassroots level for the implementation of policy and further planning.

Turner (2001) argues that the traditional ways of collecting, storing and managing NTFPs practiced by aboriginal forest people would be more useful for present forest and forest products conservation policy than more contemporary 'scientific' forest resource management techniques. Gunatilake (1998) suggested that the "sustainable harvest of timber and non-timber resources to maximize social welfare should be the overall objective of production forest management … with minimum or no human disturbance" (Gunatilake, 1998, p. 274).

Until recently, it was not thought that NTFPs could be important in policy making for the conservation of forest and forest products and betterment of forest livelihoods. Chanthirath's

(1998) work at the Vang Vieng district of Vientiane province in Laos, focused on the uses of forest products by forest dwellers and tried to find an alternative way to control rapid forest degradation. Before implementing forest and forest products policy, governments in different countries are presently trying to find out the importance of forest products to forest livelihoods. If government policy considers the actual importance of forest products in forest peoples' socio-cultural lives as well as their economic importance, then it would be more useful to control the present degradation and for the future evolution of forest and forest products. According to Peters *et al.* (1989), "… the problem lies not in the actual value of these resources, but in the failure of public policy to recognize it" (Peters *et al.*, 1989, p. 656).

It is not possible to protect forest areas by separating forest people from their forest area. The poor economic condition of indigenous forest people compels them to depend on forest products. According to Emery (1998),

> "… large-scale commercialisation can reduce the flexibility of specialty forest products (SFP) as a livelihood strategy and limit rural community access to gathering as a cultural and recreational opportunity. These effects fall most heavily on those with the least financial resources because they have limited income opportunities and cannot pay for substitute goods or activities." (Emery, 1998, p. 30)

As NTFPs have great importance for the protection of forest areas through the socio-economic progress of tropical forest areas, NTFPs should get special attention during the time of policy formulation (Emery, 2001).

Taking into account the importance of NTFPs, the USA has already prepared an explicit policy for NTFPs harvesting. As NTFPs can take a significant role in preserving forest ecology by reducing the over dependency on timber products; two policies have been implemented in the USA in the latter half of the 1990s to guide the substantial management of NTFPs. NTFPs are normally collected by poor rural dwellers for their livelihoods. Thus, it is worthwhile to maintain a suitable market value for their collected products. The quantity and the strategy of harvesting for each NTFP should be considered during the construction of policy.

> "In February 1999, the U.S. Congressional Subcommittee on Forestry and Public Land Management convened a hearing to explore opportunities for and constraints to increased harvesting of NTFPs on national forest land. By the end of that year, national legislation had passed to establish a pilot program to manage NTFPs (H.R. 2466 1999, section 339). This program has three important provisions: 1) recover fair

> market value, 2) collect fees that reflect real costs, and 3) determine sustainable harvest limits." (http://www.forestencyclopedia.net/p/p1878; cited on 27th January 2009)

The NTFP policy of the UK largely focuses on the sustainable management of these products to elevate the economic status of rural communities and the related small businesses and industries (Forestry Commission UK website: http://www.forestry.gov.uk/; cited on 28th August 2009).

Policies on NTFP harvesting differs considerably from developed countries to developing countries, where the number of forest dependent people is considerably higher and at the same time the amount of forest cover is less. In countries like Nepal, the total geographical area and its forest cover is relatively small. The number of forest dependent people, however, is substantially higher because of the high percentage of rural people within the total population. Many of these forest fringe rural people have a very low socio-economic status so forest product collection and sale is one of the most important sources of income for them.

Nepal is renowned for medicinal herb production. Because of its location in the Himalayan belt, thousands of medicinal herbs are available here. There is a significant international demand for these herbs so thousands of forest fringe dwellers collect them all year round. With the increase in the collection of aromatic plants for commercial purposes, the forest ecology of Nepal has been disturbed. Most of the herbs used to be sold through informal marketing channels with no restrictions or regulations to control this trade. In response to this situation, the Nepal government devised a policy in 2004 for the systematic harvesting of medicinal herbs and other NTFPs and to protect the forest cover. According to the Herbs and NTFP Development Policy (2004) of Nepal:

> "Herbs and NTFP Development policy (2004) addresses the holistic development of NTFP sector in Nepal. It has set a long-term goal and some specific objectives. The long-term goal of the policy is to substantially contribute to the Nepalese economy by conserving and preserving high value herbs and NTFPs and establish Nepal as an enormous source of Herbs and NTFPs internationally by the year 2020. ... In general, the NTFP policy 2004 still lacks the provision of identifying and mitigating risks but at least it provides some directions and supports to NTFP development." (http://www.eson.org.np/Forest%20Sector%20Policies%20National.pdf; cited on 15th April 2009)

In Mexico and Bolivia, there is no separate policy for NTFP harvesting. However, NTFPs play an important role in their rural forest communities. The informal marketing channel of NTFPs is even stronger in these two countries. General forest laws are used for NTFP harvesting which creates confusion among actual collectors as well as primary purchasers. This is the primary reason behind a recent move to strengthen informal marketing channels of NTFPs in Mexico and Bolivia. According to Schreckenberg *et al.* (2006):

> "Legal issues are generally not a constraint to small-scale NTFP producers operating in the informal market, and few of the community members interviewed knew anything about the legal requirements for trade of NTFPs. This reflects the fact that neither Bolivia nor Mexico has much legislation specific to NTFPs, and that which does exist is poorly implemented by overstretched officials. In both countries, NTFPs are covered by various environmental laws and regulations that are predominantly concerned with timber production and/or biodiversity conservation. ... The overlay of often contradictory regulations originating from each of these laws generates confusion among both NTFP producers in the formal sector and the institutions issuing NTFP exploitation permits." (Schreckenberg *et al.*, 2006, p. 91)

Internationally, there has been an increase in the academic and non-academic research on NTFPs and forest livelihoods from the perspective of historical geography including colonial forestry, indigenous knowledge, developmental issues, political ecology and environment and society. However, most of the research has been done based on specific issues. For example, Torras (2000), Mendelsohn (1994), Peters *et al.* (1989) have focused only on the commercial importance of forest and forest products, whereas, Belcher *et al*. (2005) and Byron and Arnold (1999) discussed the importance of NTFPs in terms of forest management through the diminution of rural poverty. While Turner (2001), Emery (1998), Steinberg (1998) and Pulido and Caballero (2006) have concentrated on the NTFPs based socio-cultural life; Pfund and Robinson (2005), Salisbury (2002) and Putz *et al*. (2001) were more concerned about the sustainable harvesting of NTFPs to save the forest ecology.

Less attention has been paid to a more holistic perspective on NTFPs and forest livelihoods. Research on NTFPs from a particular standpoint may hinder to construct a comprehensive policy to manage the forest cover along with the development of socio-economically deprived forest dwellers. For the construction of a comprehensive plan on NTFPs and forest livelihoods, therefore, it is important to conduct research that will coalesce all the related perspectives.

2.3 Importance of NTFPs in forest livelihoods in India

From an investigation of Indian forest history, it is clear that NTFPs had a great influence on forest communities' livelihoods (Schlich, 1876 and 1906; Cavendish, 2000; Ribbentrop, 1900; Jewitt, 2002b). Traditionally, NTFPs were used for food, fuel-wood, medicine and for other subsistence purposes in India. During the colonial period, only timber and a few non-wood forest products (like, bamboo, grass, resin, gum etc.) got priority for commercial purposes. Sivaramakrishanan (1999) describes how the scientific forest policies of the East India Company and later the British Government disrupted the forest resources (NTFPs) and the socio-cultural lives of forest dwellers in India. NTFPs (such as Sal seed, citronella oil, honey etc.) used to be collected as raw materials for several industrial products. Therefore, the use of NTFPs by indigenous people for their subsistence purposes was restricted. Forest people were evicted from forest areas to succeed the scientific forest management. Sometimes forest communities forcefully (or can say illegally) tried to obtain their household needs (NTFPs) from the forest and created conflict with forest officers (Guha, 1989; Jewitt, 1995).

During the British colonial period (1757 – 1947), there were no policies seeking to promote the economic development of forest dwellers through the systematic harvesting and management of NTFPs. The 'Annual Forest Report' (1865-1940) of the colonial British government revealed the amount of gathering, marketing and exportation of NTFPs for economic purposes. From articles by Ribbentrop (1900) and Schlich (1906), it is clear that NTFPs used to be collected, from reserved forests, for industrial purposes and most of them were exported to Britain. Forest dwellers were allowed to collect NTFPs from protected and unclassed state forests for their daily household needs and to sell a portion of it at the local market. During her research in Jharkhand, the neighbouring state of West Bengal, Sarah Jewitt (2002) found from the *khatiyan* records that, during the British colonial period and beyond, forest communities could collect NTFPs from protected and unclassed state forests for their subsistence purposes. NTFP collection was also permitted within reserved forests, but was subject to restrictions detailed in the *Khatiyan* part 2[4] (Jewitt, 2002).

Even after independence (August 1947), the policies regarding NTFPs and forest livelihoods of India did not change very much. Following British colonial forest policy, the Government of India implemented several strict rules and regulations to control deforestation by illegal felling (Saxena, 2003). This situation compelled many of the forest communities to shift to other occupations and subsequently their livelihoods were also changed (Chowdhuri *et al.*, 1992).

[4] *Khatiyan* (Record of right) part 2 contains details of landholders, area of holding, land classification, boundary, land revenue and status of irrigation (Jewitt, 2002).

The implementation of the Forest (Conservation) Rules, 1981 was the toughest decision from the Central Government, in terms of restrictions in forest products collection, to protect forest cover. However, due to several protest movements all over India, Central Government was compelled to review and subsequently change the policy (Singh, 2004).

Due to restrictions on the collection of NTFPs (for subsistence as well as commercial purposes), a significant number of forest (specially tribal) people shifted away from forest-based livelihoods to work in agriculture or as daily wage labourers. This change of occupation affected their socio-cultural lives as well. Previously forest plants in India were used for medicinal purposes, but because of present restrictions on NTFPs collection by native people the new generation of tribal communities do not know the efficacy of several medicinal herbs like their ancestors (Negi and Bhalla, 2002).

From the late 1970s and early 1980s, forest officers started realising that, without the cooperation of forest communities, it was not possible to reverse forest degradation. Finally, the Government of India decided that the Forest Department staff should collect forest products and then sell those products to forest communities at a nominal price so that forest dwellers could get NTFPs for their domestic purposes without entering the forest area. However, this policy also failed because of political interference and the influence of commission agents and small businessmen (Singh, 2004; Mahapatra and Mitchell, 1997).

Through the implementation of the National Forest Policy 1988, the Central Government of India planned that the NTFPs should be used first of all for the improvement of forest peoples' socio-economic condition with the rest being used as raw material for different industrial products. This aim has not been fulfilled, however, and many of the State Forest Departments or FDCs supply these products to industries following their long-term agreements to earn more revenue from NTFPs.

In this situation, Joint Forest Management (JFM) was put forward as a new approach to managing and protecting degraded forests (Joshi, 1983; Kumar, 2002). In JFM, forest protection committees (FPC) are set up and given responsibility for protecting forests and in return they can collect their daily household needs from forest areas. When mature trees or some NTFPs are collected by Forest Department for commercial purposes, the FPCs also get a percentage (which varies from state to state but is 25% in West Bengal) of the profit. In several states, Forest Development Corporations were also constituted following the basic ideas and objectives of JFM (Singh, 2004).

Unfortunately, there are several restrictions on the collection of NTFPs by forest communities in several states of India. The degree of control by the Forest Department, however, varies from one state to another. After independence, some NTFPs (like Kendu leaves, Sal seeds) were nationalised based on their importance and availability. Only Forest Department authorised organisations have rights to collect those nationalised NTFPs using FPCs or Large Scale Multipurpose Cooperative Societies (LAMPS). Forest dwellers or tribal community members, who are not associated with JFM or LAMPS, have no right to collect or sell those products on the open market. Forest officers or Forest Development Corporations (state government recognised) can use FPC or LAMPS members as wage labourers to collect those nationalised NTFPs for sale to the organised market.

The remuneration that forest people get from the Forest Department or Forest Development Corporation (FDC) varies from one state to another. In some cases, the prices of NTFPs are less than the actual market price. For example, the Forest Development Corporation of Orissa (a state of eastern India) pays the actual collectors only Rs. 18 / Kg for honey while if the actual collectors sell that honey to the open market directly they will be paid Rs. 50 /kg. Therefore, it is clear that the nationalisation of NTFPs has not helped forest people or actual collectors to develop their economic portfolios (Saxena, 2003).

Like other countries of the Global South, in India there is a high probability that forest and forest products policy will work ineffectively. In their article, '*Programmed to Fail? Development Projects and the Politics of Participation'*, Kumar and Corbridge (2002) have shown how development projects and policies in Jharkhand were destined to fail because of the local systems and political divergence. With changes in elected government, natural resource management and production policies also change, which can have a major impact on local people who harvest natural resources. The scenario is similar in the case of NTFPs harvesting. A long-term strategy regarding the harvesting, management and marketing of NTFPs might be useful to contribute towards the economic improvement of forest livelihoods.

Relatively few studies (for example, Mitchell *et al.* 1999; Corbridge and Kumar, 2002; Mahapatra and Tewari, 2005; Malhotra, 1993; Jewitt, 1995 and 2002) have focused on the collection, storage, marketing of NTFPs and the policies relating to NTFP harvested in India. In most cases, these works have been undertaken focusing on a particular topic related to NTFPs harvesting. Therefore, this research intends to bridge the gaps between different geographical aspects in terms of NTFPs and forest livelihoods. The research focuses on several geographical issues including forest products based knowledge development, livelihoods and economics, forest ecology and sustainable forest management and forest products policy.

2.4 NTFPs and the forest livelihoods in West Bengal

In West Bengal, NTFPs are collected from about 154 wild plant species for the use of food, fuel-wood, fodder, medicine, cottage industries (handicrafts), construction, industrial materials and different ritual purposes. The average per household income from NTFPs was around $87 per annum in 1991-92 (Poffenberger *et al.*, 1996). Around 189 types of NTFPs are found in the dry-deciduous forests of south-western West Bengal alone of which 113 are from plants and 76 from animals. Forest dwellers use different parts of the same plant as NTFPs for different household as well as commercial purposes (Malhotra, 1993).

The collection of NTFPs by forest people has been neglected in West Bengal until the 1990s. The World Bank Implementation Completion Report (1998a) shows that there is no well-constructed project report to clarify the objectives or ideas regarding the collection, storage, marketing and management of NTFPs for the socio-economic enhancement of forest dwellers. Due to a lack of infrastructure forest dwellers cannot store their collected products, so agents or middlemen collect these products from the actual collectors for a nominal price.

Most of the previous research on NTFP and forest livelihoods in India and West Bengal has been conducted in reserved forests of tropical and temperate regions (Chandrasekharan, 1998; Mallik, 2000; Corbridge and Kumar, 2002; Mahapatra and Tewari, 2005). However, a significant amount of NTFPs are harvested from open (protected) forests as well. There are no government records about many of these products (Department of Forest, 2004 and 2005; WBFDC, 2006). Therefore, this research will focus on forest livelihoods in tropical dry-deciduous forests of West Bengal and the extent to which forest people are exploited by middlemen or mobile agents. In the open dry-deciduous forest areas of south-western West Bengal, many forest dwellers have a low socio-economic status and a number of NTFPs are marketed through informal channels by middlemen and mobile agents. This area is therefore an ideal place to conduct such research and to address existing gaps in the NTFP literature.

Chapter 3

Geo-physical background of the research area

3.1 Introduction

This chapter provides geo-physical information about West Bengal and the three districts studied (Appendix 4). Particular attention will be placed on how local physiographic features influenced the development of open dry-deciduous forest areas, the nature of forest and forest-people relationship in the study areas and why the areas have been selected for this research.

3.2 Geographical location of the State

West Bengal is situated in the eastern part of India. The state has a unique identity because of its geographical location. Almost all types of physiographic landscapes (including mountains, hills, plateau, flood plain, and seashore), soil structures and climatic regions are found there. It is because of its diverse physical environment, different types of ecosystem are very common in all over West Bengal. Based on the physical environment, human livelihoods as well as socio-cultural features also vary from one part of the state to other. The century-old human settlements (Xinhuanet, 2006) in greater Bengal (including Bangladesh) had a close relationship with their natural environments and resources. For the easy availability of household products as well as to save themselves from the attacks of outsiders, forests proved to be attractive areas for settlement. The history of forest-people relationships in this area is largely unknown due to the lack of intensive research.

The present total geographical area of the state is 88,752 km² comprising 2.70% of India. The State extends from 20º 31' N to 27º 12' N latitude and from 85º 50 'E to 89º 52' E longitude (Department of Forest, 2004). In the north and north-east, the states of Sikkim and Assam and the country of Bhutan is situated. Bangladesh is situated to the East; Bihar, Jharkhand and Orissa to the west and south-west and to the south the Bay of Bengal surround the state. Before independence (Aug' 1947) West Bengal was the western part of Bangladesh (formerly East Pakistan) and it was known as the Presidency of Bengal as a whole. The state of West Bengal currently includes 19 districts. Districts are divided into subdivisions: blocks, town municipalities or panchayats. The research was conducted in the three districts of Bankura, Purulia and West Midnapur. These three districts were selected because of their physiography, climate, nature of the forests, number of forest [tribal] communities and forest-people relationships (Appendix 4).

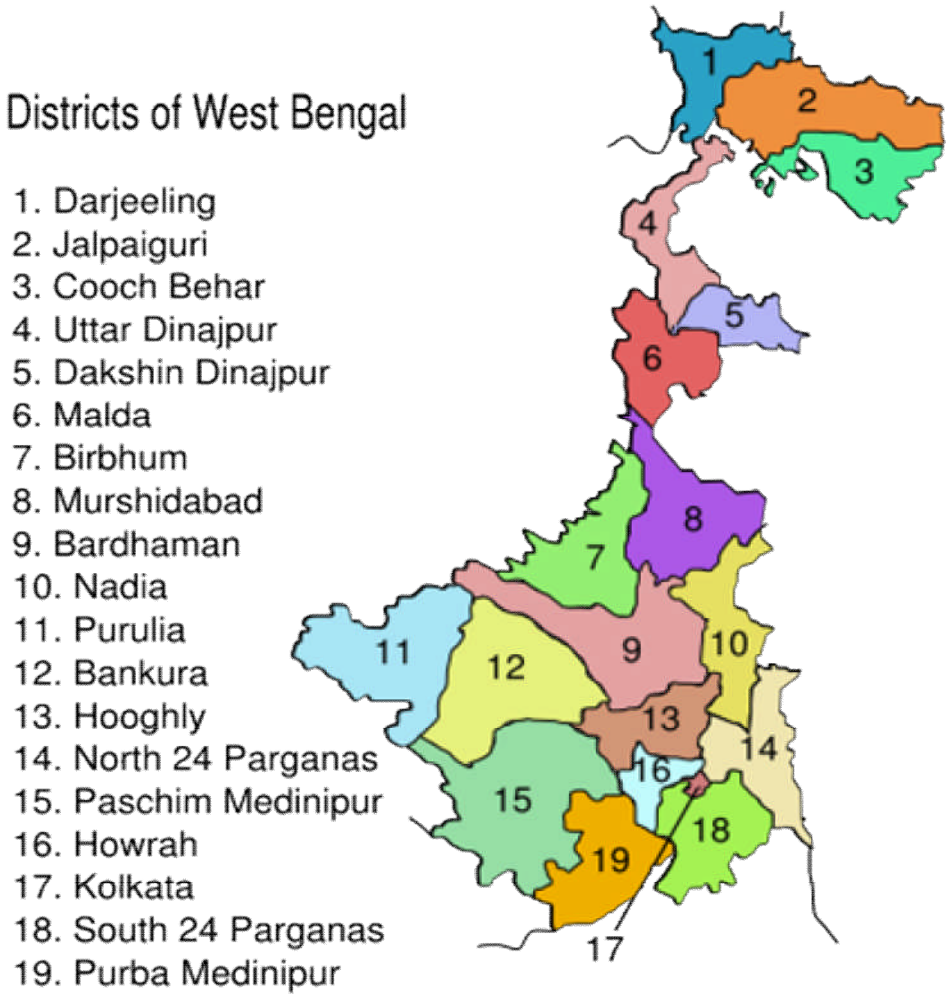


Fig. 3.1: District map of West Bengal

[An outline map not according to scale]

Source:http://upload.wikimedia.org/wikipedia/commons/thumb/1/12/WestBengalDistricts_numbered.svg/300px-WestBengalDistricts_numbered.svg.png (Accessed 7th June 2008)

3.3 Physiographic characteristics of West Bengal and the research area

From a physiographic point of view, West Bengal can be divided into two major categories: the arable zone, where agricultural activities predominate and the barren or non-arable zone. More than 70% of West Bengal's arable land is found in the districts of Uttar [north] and Dakshin [south] Dinajpur, Nadia, Murshidabad, North 24-Parganas, Hooghly, Bardhaman and parts of Birbhum districts. Non-arable lands are mainly found in the north of the State comprising the Himalayan mountain area of Darjeeling, Jalpaiguri and Cooch Behar districts and in the 24-Parganas district of southern coastal Bengal (Department of Forest, 2005).

In the northern part of the State, in the Himalayan mountain areas, the soil structure is often very shallow to shallow, excessively drained and of coarse-loamy to gravelly loamy type. Excessive rainfall throughout the year and the low to moderate temperature help to develop good quality forests that were reserved by the British colonial government for commercial timber production. The Northern Tropical Wet-evergreen Forests, Northern Sub-tropical Semi-evergreen Forests, Moist-deciduous Forests and Montane Moist-temperate Forests are found there. The geo-physical environment of the area is not very suitable for agricultural activities.

Table 3.1: Soil zones of West Bengal

Serial number (Sl No)	Soil type	Districts
1	Hilly zone	Jalpaiguri, Cooch Behar and Darjeeling
2	Laterite Soil	Purulia, Bankura, Birbhum and western part of Midnapur
3	Alluvial soil	Howrah, Hooghly, Nadia, Malda and West Dinajpur
4	Saline coastal soil	Southern part of 24 Parganas and Midnapur

Source: Shah, 1987

In the western and south-western part of the state, in the extended part of the Chhotanagpur plateau area, the soil layer is very shallow (0-25 cm) to moderately shallow (50-75 cm) whereas, the drainage categories vary from imperfectly drained to excessively drained so the rain water does not stay for a long time on the land surface. Severe soil erosion, moderately high to very high temperature throughout the year and comparatively low rainfall are other hindrances to agricultural activities in the districts of Bankura, Purulia and Midnapur[5]. Most of the protected and unclassed state forests are found in this area.

Gangetic Bengal with alluvium soil, moderate to high temperature and average rainfall of 1389 mm to 1908 mm is the best arable area of the state. Minimal forest lands, including Reserved Forests (RF), Protected Forests (PF) or Unclassed [State] Forests (UF)[6], are found

[5] On 1st January 2002, Midnapur district has been divided into two separate districts - West (Paschim) Midnapur and East (Purba) Midnapur (Fig. 3.1). The data, however, for the West Midnapur is not available separately till the date so the data of Midnapur district, as it was before 1st January, 2002, will be used in this research. The fieldwork will be arranged in the West Midnapur district only because most of the protected and unclassed state forests are located there.

[6] Reserved Forest (RF) – "An area notified under the provisions of Indian Forest Act or State Forest Acts having full degree of protection. In Reserved Forests all activities are prohibited unless permitted.

in this area. The net sown area of the state in 1970-71 was only 13.6 million acres, and it has been diminishing continuously because of urbanisation and the establishment of new industrial areas etc (MOA, 2000). At present, the per capita farmland in West Bengal is the lowest among all other states of India.

Southern coastal Bengal with moist sub-humid climate, mean annual rainfall and sandy-saline soil with a fine texture is also not very suitable for farming. The world famous Mangroves reserved forest is seen in this area.

Apart from the geographical location and the altitudinal variations, from sea level in the extreme south to the 3,700 meters high in the north, the physiographic and climatic differences have created several agro-ecological zones in the state. Around 13.38% of non-arable land includes the forest areas of West Bengal (Department of Forest, 2004).

3.4 Forest features of the State and study area

Forests are mainly found in the Himalayan mountain area in the north including the districts of Darjeeling, Jalpaiguri and Cooch Behar; in the saline coastal area of south West Bengal comprising the district of South 24-Parganas and in the extended part of the Chhotanagpur plateau area in the western and south-western part of the State.

Most of the reserved forests are seen in the Himalayan mountain area of the north and in the coastal area of south West Bengal, whereas the greatest amount of protected forests as well as unclassed state forests are found in the western and south-western part of the State including the districts of Purulia, Bankura and [West] Midnapur.

About 6,775 km², out of a total of 7,054 km² (96.04%), of reserved forests in West Bengal are found in the districts of Jalpaiguri (1,483 km²) and Darjeeling (1,115 km²) in the Himalayan mountain area and in the district of South 24-Parganas (4,177 km²) of southern coastal West Bengal.

Protected Forest (PF) – "An area notified under the provisions of the Indian Forest Act or State Forest Acts having limited degree of protection. In Protected Forests all activities are permitted unless prohibited."

Unclassed Forest (UF) – "An area recorded as forest but not included in reserved or protected forest category. Ownership status of such forests varies from state to state."

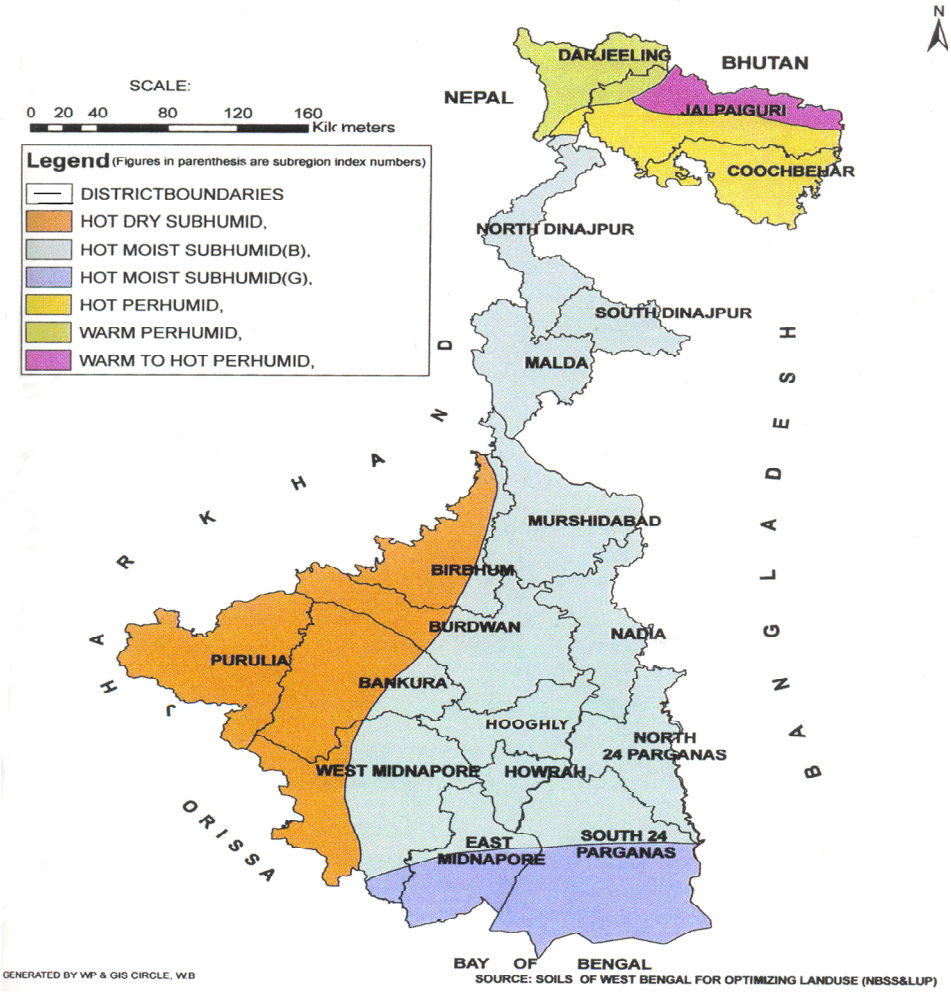
Source: State Forest Report, West Bengal 2003-2004, p. 4.

Table 3.2: Districtwise area under forests by legal status in West Bengal (2003-04)

Sl. No.	District	Reserved Forests (in km²)	Protected Forests (in km²)	Unclassed State Forests & Others (in km²)	Total area (in km²)
1	North 24 Parganas	43	-	-	43
2	South 24 Parganas	4177	42	1	4220
3	Bankura	80	1311	91	1482
4	Bardhaman	3	192	82	277
5	Birbhum	8	54	97	159
6	Cooch Behar	-	42	15	57
7	Darjeeling	1115	-	89	1204
8	Dinajpur (North)	8	4	6	18
9	Dinajpur (South)				
10	Hooghly	3	-	-	3
11	Howrah	-	-	-	-
12	Jalpaiguri	1483	217	90	1790
13	Kolkata	-	-	-	-
14	Malda	8	5	7	20
15	Midnapur (East & West)	8	1166	535	1709
16	Murshidabad	1	7	-	8
17	Nadia	5	3	5	13
18	Purulia	112	729	35	876
Total		7054 (59.38%)	3772 (31.75%)	1053 (8.87%)	11879 (100%)
All India		423,311	217,245	127,881	768,437

Source: State Forest Report, West Bengal – 2003-04, p. 14

In the reserved forests of West Bengal, rural people normally cannot enter the forest to collect forest products (including NTFPs) for their daily household requirements. To enter the reserved forests, permission from the State Forest Department is needed. Therefore the dependence of rural people on NTFPs is not that noticeable in these areas (Department of Forest, 2004).

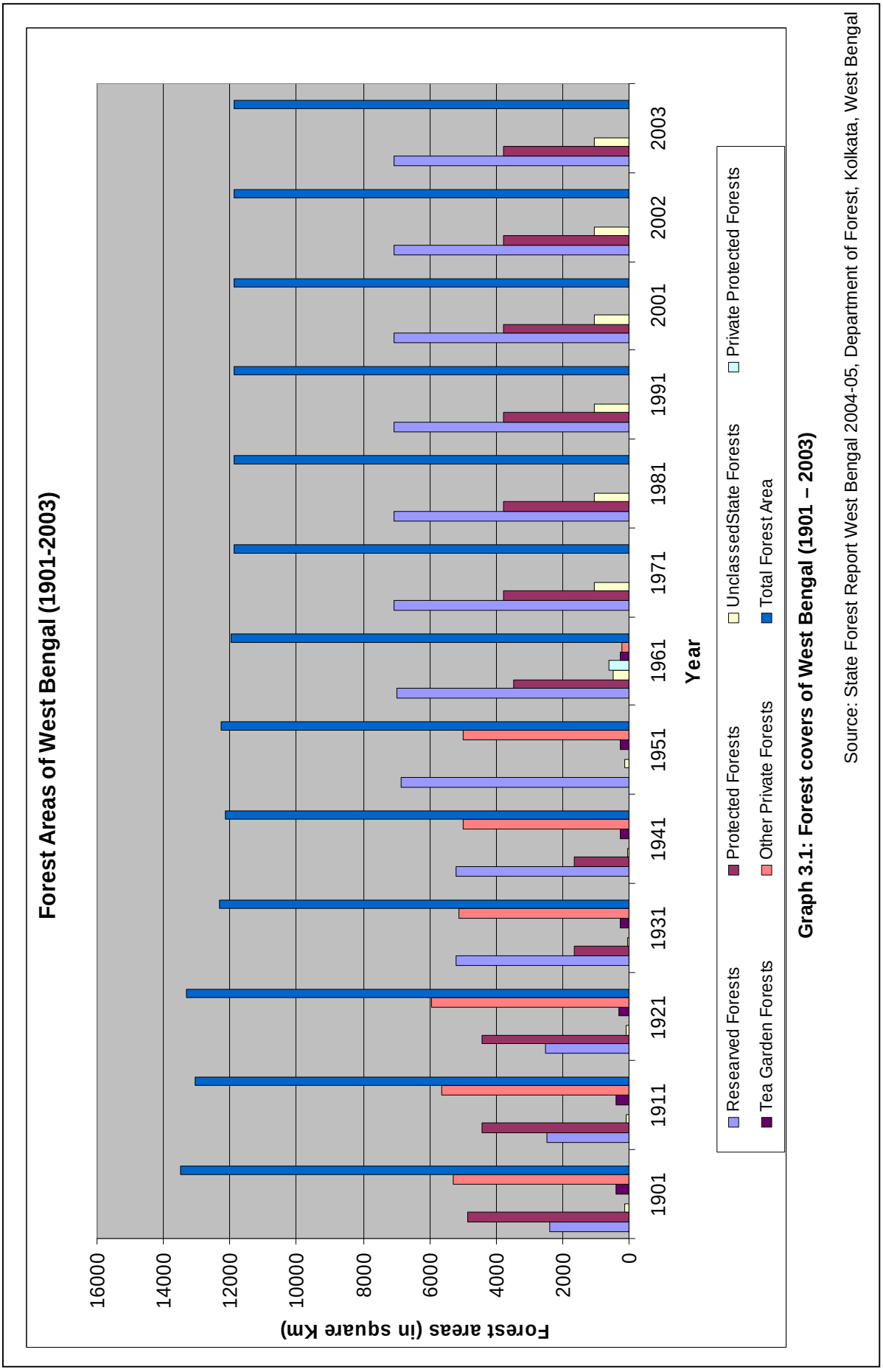


Source: State Forest Report, West Bengal 2003-2004, p. 21A.
B- Indo-Gangetic plain
G- Coastal parts of West Bengal

Fig. 3.2: Agro-ecological sub-regions of West Bengal

Source: State Forest Report, West Bengal 2003-04, p. 21A

Protected forests are mainly found in the west and south-western part of West Bengal (3206 km² out of total 3,772 km², that is 84.99%) including the districts of Bankura (1,311 km²), Midnapur (1,166 km²) and Purulia (729 km²). This area mainly represents the extended part of the Chhotanagpur Plateau. Forest dwellers can collect NTFPs from the protected forests for their daily household purposes without any prior permission from the Forest Department.



Graph 3.1: Forest covers of West Bengal (1901 – 2003)

Source: State Forest Report West Bengal 2004-05, Department of Forest, Kolkata, West Bengal

The largest amount of unclassed state forests (total 1,053 km²), in the State is also located in the western and south-western part, including the districts of Midnapur (535 km²), following Birbhum (97 km²) and Bankura (91 km²). People living in or around the unclassed state forest areas can also collect NTFPs for their daily household purposes without any government permission (Department of Forest, 2005). Therefore, the NTFPs, collected from protected forests and unclassed state forests of Bankura, West Midnapur and Purulia districts of West Bengal, have a very significant role on the livelihoods of forest dwellers in these areas. This is why the protected forests and unclassed state forests of these three districts have been selected as the study area for this research.

Table 3.3: Districtwise distribution of geographical & recorded forest land in West Bengal (2005)

Sl. No.	District	Geographical area (in km²)	Recorded forest area (in km²)	% age of recorded forest area
1	24 Parganas (South)	10,159	4,220	41.54
2	Darjeeling	3,149	1,204	38.23
3	Jalpaiguri	6,227	1,790	28.75
4	Bankura	6,882	1,482	21.53
5	Purulia	6,259	876	14.00
6	Midnapur (East & West)	14,081	1,709	12.14
7	Bardhaman	7,024	277	3.94
8	Birbhum	4,545	159	3.50
9	Cooch Behar	3,387	57	1.68
10	24 Parganas (North)	3,977	43	1.08
11	Malda	3,733	20	0.54
12	Dinajpur (South)	2,219	8	0.36
13	Dinajpur (North)	3,140	10	0.32
14	Nadia	3,927	13	0.30
15	Murshidabad	5,324	8	0.15
16	Hooghly	3,149	3	0.10
17	Howrah	1,467	-	0.00
18	Kolkata	104	-	0.00
	Total	88,752	11,879	13.38

Source: State Forest Report, West Bengal 2004-05, p. 14

Except the total forest areas of the districts of South 24-Parganas (41.54%), Darjeeling (38.23%) and Jalpaiguri (28.75%), which are mainly reserved forest, other important forest areas, mainly protected and unclassed state forests, are found in the districts of Bankura (21.53%), Purulia (14.00%) and [West] Midnapur (12.14%).

The Tropical Dry Deciduous Forests of West Bengal (0.43 million hectares), from where the majority of NTFPs including leaves, seeds, and other household products are collected by the forest dwellers, are mostly found in the districts of [West] Midnapur, Bankura and Purulia.

For the conservation of forests and wildlife of this area, presently the State Forest Department has been working in association with local forest dwellers of this region (Department of Forest, 2005). However, the highest levels of forest degradation[7] in West Bengal are also found in the districts of Midnapur (232.82 km²), following Bankura (191.02 km²) and Purulia (172.34 km²).

Table 3.4: Degraded notified forest lands in West Bengal (2005)

Sl. No.	District	Unit (in km²)
1	24 Parganas (North)	2.37
2	24 Parganas (South)	37.02
3	Bankura	191.02
4	Bardhaman	77.08
5	Birbhum	0
6	Cooch Behar	6.9
7	Darjeeling	44.6
8	Dinajpur (North)	0
9	Dinajpur (South)	0
10	Hooghly	0
11	Howrah	0
12	Jalpaiguri	13.43
13	Kolkata	0
14	Malda	0
15	Midnapur (East & West)	232.82
16	Murshidabad	0
17	Nadia	0
18	Purulia	172.34
	Total	777.58

Source: Wetland ATALS of India, 2000, in State Forest Report, West Bengal–2004-05, p. 19

The encroachment of forest areas for agricultural, settlement and other purposes are also highest in the districts of Bankura (5724.679 hectares), Midnapur (4280.714 hectares) and Purulia (1615.790 hectares). With the decrease of forest areas in these three districts, the number and type of NTFPs also decreased considerably. This has caused an increase of illegal timber felling mainly by forest people. Illegal timber felling is again reducing the forest area. Thus, a vicious circle is working which is adversely affecting the forest ecosystem as well as forest livelihoods in this area.

[7] Forest degradation: The reduction of woodland covers.

Table 3.5: Status of encroachment of forest lands in West Bengal (2005)

Sl. No.	District	Area under encroachment (Ha.)
1	24 Parganas (North)	-
2	24 Parganas (South)	29.500
3	Bankura	5724.679
4	Bardhaman	701.630
5	Birbhum	165.880
6	Cooch Behar	71.000
7	Darjeeling	377.060
8	Dinajpur (North)	0
9	Dinajpur (South)	6.930
10	Hooghly	3.420
11	Howrah	-
12	Jalpaiguri	296.464
13	Kolkata	0
14	Malda	262.000
15	Midnapur (East & West)	4280.714
16	Murshidabad	4.000
17	Nadia	0
18	Purulia	1615.790
	Total	13,539.567

Source: State Forest Report, West Bengal – 2004-05, p. - 48

3.5 Human-forest cohabitation in the State and research area

According to the census data of 2001 (Ministry of Home Affairs, 2001), the total population of the State was 80.2 million, containing 7.8% of India's total population with the highest density of population (904 persons/km²).

> "About 72 per cent of the people live in rural areas. According to the Planning Commission, the proportion of population below the poverty line in 1999-2000 in West Bengal was 31.85 per cent. The percentages of scheduled caste and scheduled tribe[8] populations are 28.6 and 5.8 respectively in the rural areas and 19.9 and 1.5 respectively in the urban areas." (Development and Planning Department, 2004, p. 4)

Though the majority of the total State population are Bengalis, a considerable number of tribal (*Adivasi*) people (4.4 million as per 2001 census) are also found in different districts. Santals, Kol/Munda, Totos are the major tribal communities of the State. A considerable

[8] "Scheduled Castes (SC) and Scheduled Tribes (ST) are communities that are accorded special status by the Constitution of India. These communities were considered 'outcastes'... The Scheduled Tribes were unable to participate in the community life of the Indian Society and were thus deprived of any opportunity for integration with the rest of the society and corresponding opportunities for educational, social and economic growth. The Scheduled Caste peoples are also known as Dalits; Scheduled Tribe people are also referred to as Adivasis. ... SCs/STs together comprise over 24% of India's population, with SC at over 16% and ST over 8% as per 2001 census." (Source: http://en.allexperts.com/e/s/sc/scheduled_castes_and_tribes.htm, cited on 12th July 2009.)

number of these tribal communities are still living in or around the forest fringe areas, especially protected forests or unclassed state forests of West Bengal. The livelihoods of these communities are very much dependent on the forests and forest products (Das, 2005).

Around 8,571 of a total 37,910 villages in West Bengal are found in or around forest areas, especially in protected forests or unclassed state forests. These villages contain 0.61 million hectares of land with a total population of 8.40 million (MOA, 2000). The largest number of tribal people (0.8 million), who are mainly living in or around forest areas, are seen in the district of Midnapur (mainly in West Midnapur) followed by Jalpaiguri (0.6 million), Purulia (0.5 million) and Bankura (0.33 million). According to the 2001 census data, around 15,92,919 tribal people are living in the three districts of Bankura, Midnapur and Purulia (Appendix 4). Each year these people collect an enormous amount of NTFPs for their domestic as well as commercial (especially Kendu leaves and Sal seeds) purposes (Ministry of Home Affairs, 2001).

3.6 Why the area has been selected for this research

Due to the lack of arable-land and limitations on agricultural activities, the forest people of these three districts (Bankura, Purulia and West Midnapur) usually go to the districts of Bardhaman, Birbhum, Nadia and Hooghly as agricultural wage labourers during the monsoon (June – August) and late autumn (October – November) seasons when the collection of NTFPs is less widely practiced. For the rest of the year, their main occupation is the collection of NTFPs from the local forest. The drought prone areas of the districts of Purulia, Bankura and West Midnapur are quite famous for their unique tropical dry-deciduous forest, which covers only 0.430 million hectares in India as a whole (Department of Forest, 2005). The typical forest type and the long-standing forest-people relationships of this area is an interesting topic to natural as well as social scientists (Mahapatra and Tewari, 2005). The lateritic zone, popularly known as the '*Rarh Bhumi'*, covers Purulia, Bankura and West Midnapur districts and parts of Birbhum district of West Bengal. The hot moist sub-humid to very hot dry sub-humid climate, the nature of the soil (mainly red lateritic soil) and the physiographic landscape are the main reasons why this special [typical] type of forest is concentrated in these three districts. The main tree species found in this forest area are Sal (*Shorea robusta*), Kendu (*Diospyros melanoxylon*), Karaya (*Anogeissus latofolia*), Salai (*Boswellia serrata*) and Bahera (*Terminalia belerica*) (Department of Forest, 2004).

Some other minor forest products including medicinal herbs and decorative items are also collected in these three districts (WBTDCC, 2005b). These products also come under the category of NTFPs. However, no definite government record is available regarding the types,

amount of collection, storage and marketing of these products. These decorative products as well as medicinal herbs have a very good market demand in the metropolitan cities of India as well as in the western world. Each year, a significant amount of these NTFPs are exported from West Bengal to other states or even other countries through middlemen, agents and local businessmen (Chowdhuri *et al.*, 1992).

Government organisations like WBTDCC or WBFDC or the Forest Department of West Bengal, however, have no control over this exploitation, which is obviously higher in protected and unclassed state forests (as forest people can enter protected forests or unclassed state forests without forest department permission) compared to the reserved forests. Therefore, the research was conducted on the NTFPs and the forest livelihoods of the open dry-deciduous forest areas (including protected forests and unclassed state forests), which are mainly located in the western and south-western part of the State including the districts of Purulia, Bankura and West Midnapur.

3.7 A brief introduction of research villages

Eleven forest villages – four each from Purulia and West Midnapur districts and three from Bankura districts were surveyed for this research. The villages of Bhuda, Sirkabad-Bhelaidih, Kalabani and Gurahata are located in Arsha block of Purulia district (Fig. 3.3). The Block was selected due to several socio-physical reasons (Appendix 4). For example, the Block contains the high hilly area of the Ajodhya range, undulating terrain and the cultivated plain as well as barren land. Forest cover is mainly found in the upland areas, although some is on the plain. There is no urban area in the Block. The people are mainly farmers or wage labourers. Due to the unfertile land surface and insufficient irrigation farming is mainly carried out during the monsoon. Lack of industrial activities and other wage-labouring jobs increases the dependence of the population on forest products collection.

A considerable number of tribal people have lived within or in the vicinity of the forests of Purulia district for centuries. The local forests have an important role in their socio-economic life. Villages such as Bhuda, located within the interior forest area, are mostly tribal dominated (Fig. 3.3). Tribal people (25% of the total Block population) from interior forest villages collect more NTFPs for their household needs than they sell at the local market. On the other hand, villagers from Sirkabad-Bhelaidih and Kalabani mostly collect forest products to sell at the market and these villages are situated near the local village market. Gurahata village is in the foothill area, people collect forest products for household consumtion as well as to sell at the Sirkabad local market.

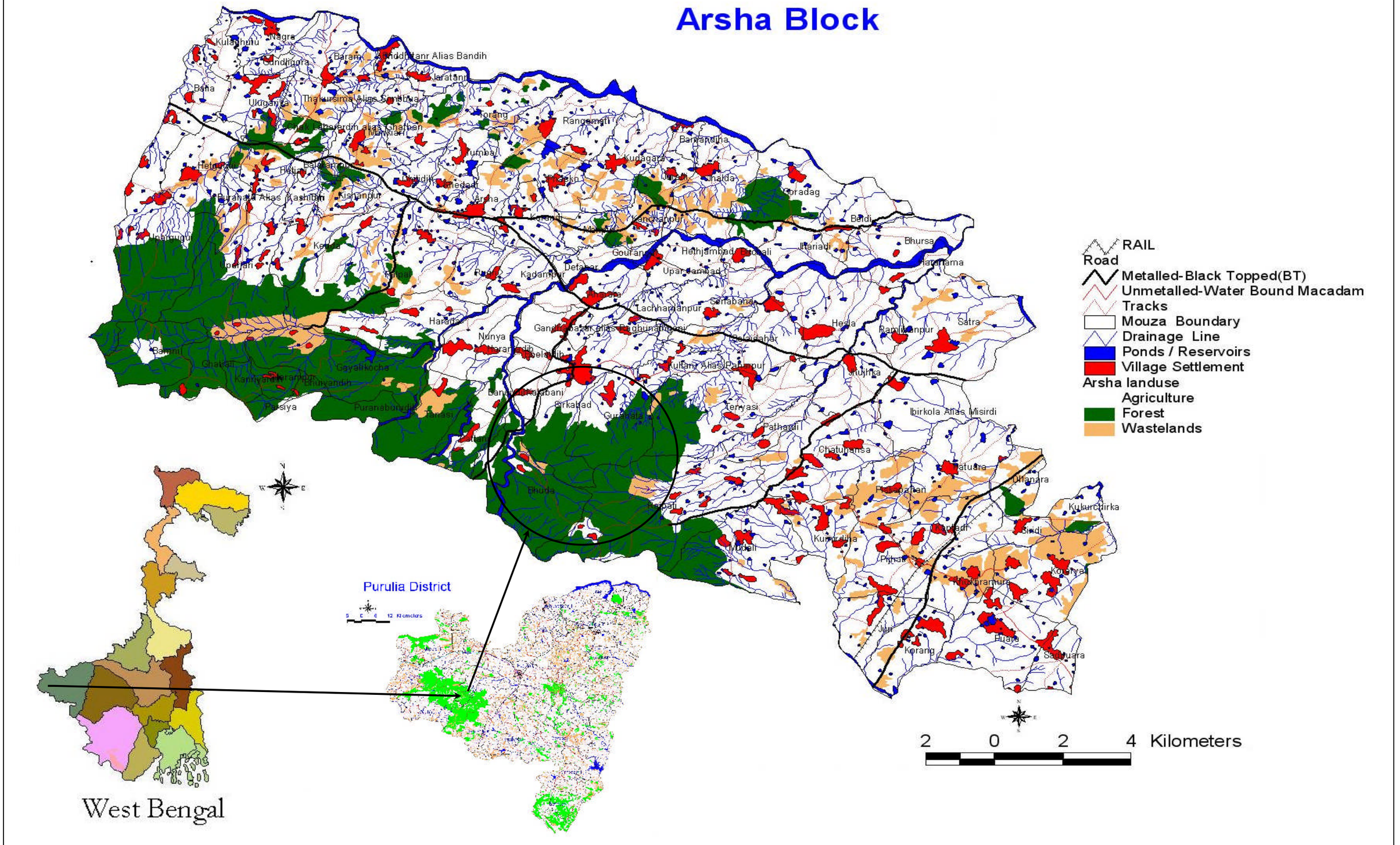


Fig. 3.3: Research villages in Arsha block of Purulia district

Source: NRDMS, Purulia

Forest fringe villages comprise mostly mixed population, where tribal, non-tribal backward class (depressed class) as well as lower middle class people live. Local middlemen or mobile agents live in these villages and visit interior forest villages quite often to collect NTFPs from tribals. Forest fringe villagers sometimes also sell their collected NTFPs to middlemen to avoid to go the Purulia town market which is about 30 kms away from the Block. A LAMPS storage centre is found at the Sirkabad village, which normally collect Kendu leaves and sometimes Sal seeds.

In Bankura district, three villages were surveyed which are situated in Ranibandh block. The Block is famous in the State for NTFPs harvesting. Villages include Jamdaha, Barudi and Katiam (Fig. 3.4). Jamdaha is positioned within the interior forest, Barudi is placed in the forest fringe area, whereas Katiam village is near the local market of Ranibandh (2.5 km away). In Ranibandh block there is no hilly tract. Most of the area is undulating land with some cultivated plain land. The climate of the District is quite similar to Purulia with a dry-cool winter and hot to very hot summer. As monsoon rainfall is the main source of water for agricultural activities in the Block, marginal forest fringe people manage their livelihoods by wage labouring jobs and harvesting forest products in the dry season (Appendix 4).

According to the Census data of 2001, about 47% population of the Block are scheduled tribe, living at the vicinity of woodlands. Jamdaha is a tribal village where most of the people collect forest products for their household needs and mobile agents visit the village quite often to purchase a few NTFPs such as Sal seeds, Sal plates, Mahua flower etc. Villagers have some cultivated land within the forest and they do wage labouring jobs as well whenever they get work. Barudi also is a tribal village but they do not collect as many NTFPs as Jamdaha villagers. Barudi villagers collect most of the NTFPs to sell at the Ranibandh local market. In Katiam village there is a mixture of scheduled tribe as well as non-tribal people. Economically, these people are well off compared to the other two research villages of the Block (Appendix 4). The Ramkrishna Mission Lokasiksha Parisad and LAMPS storage centres are located in this village. Forest dwellers from other parts of the Block come here if they wish to sell their collected NTFPs through these organisations.

In Ranibandh block, there are some mining areas but no large industrial units. The percentage of government employees or any other organised sector workers is very low (less than 15% of the total). Due to the lack of irrigation systems, unfertile land and the absence of other industrial activities, the collection of NTFPs can take a very important role in the livelihoods of forest fringe villagers (Appendix 4). The exploitation of villagers by mobile agents is also noticeable.

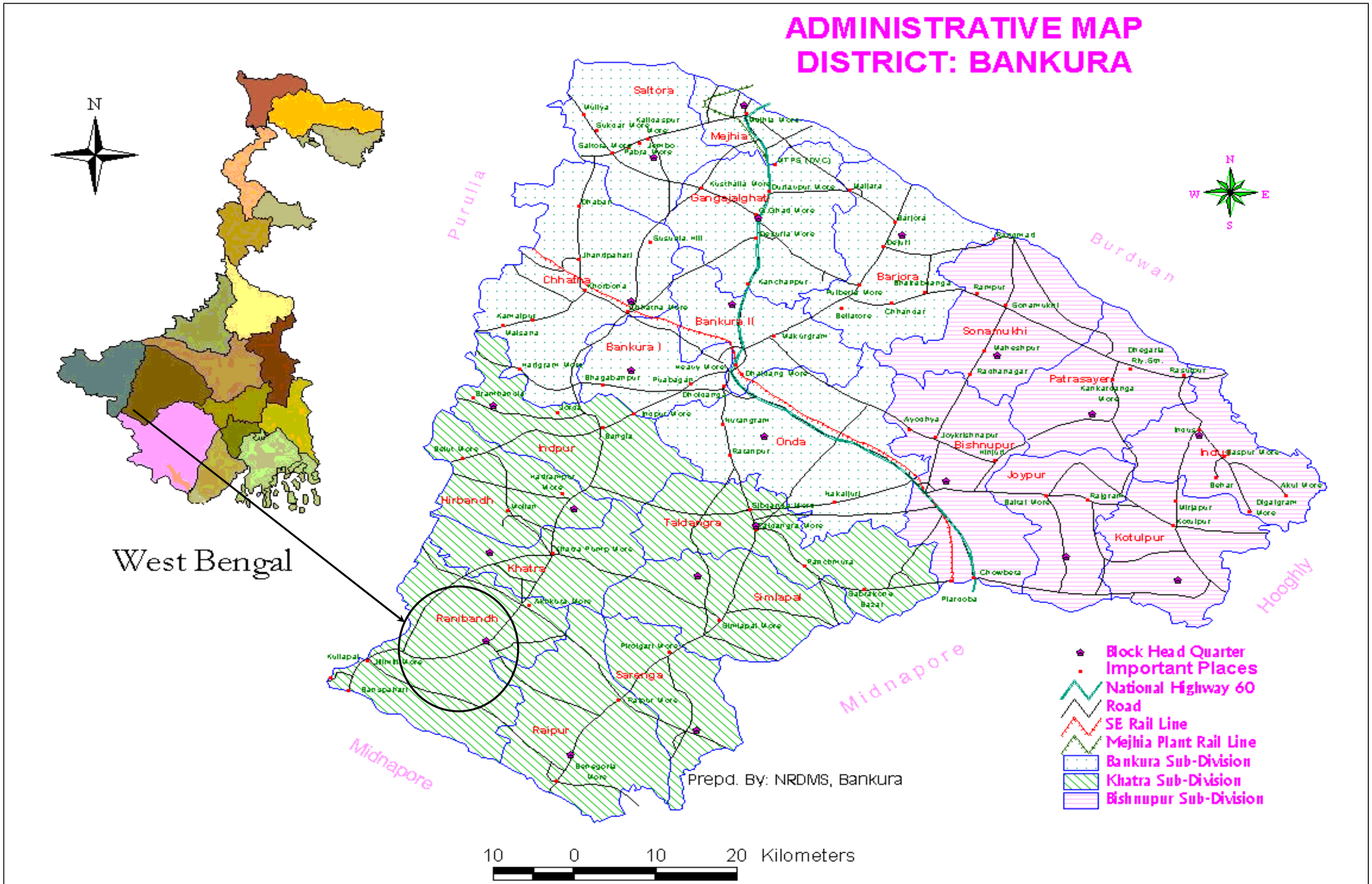


Fig. 3.4: Research area in Ranibandh block of Bankura district

Source: NRDMS, Bankura

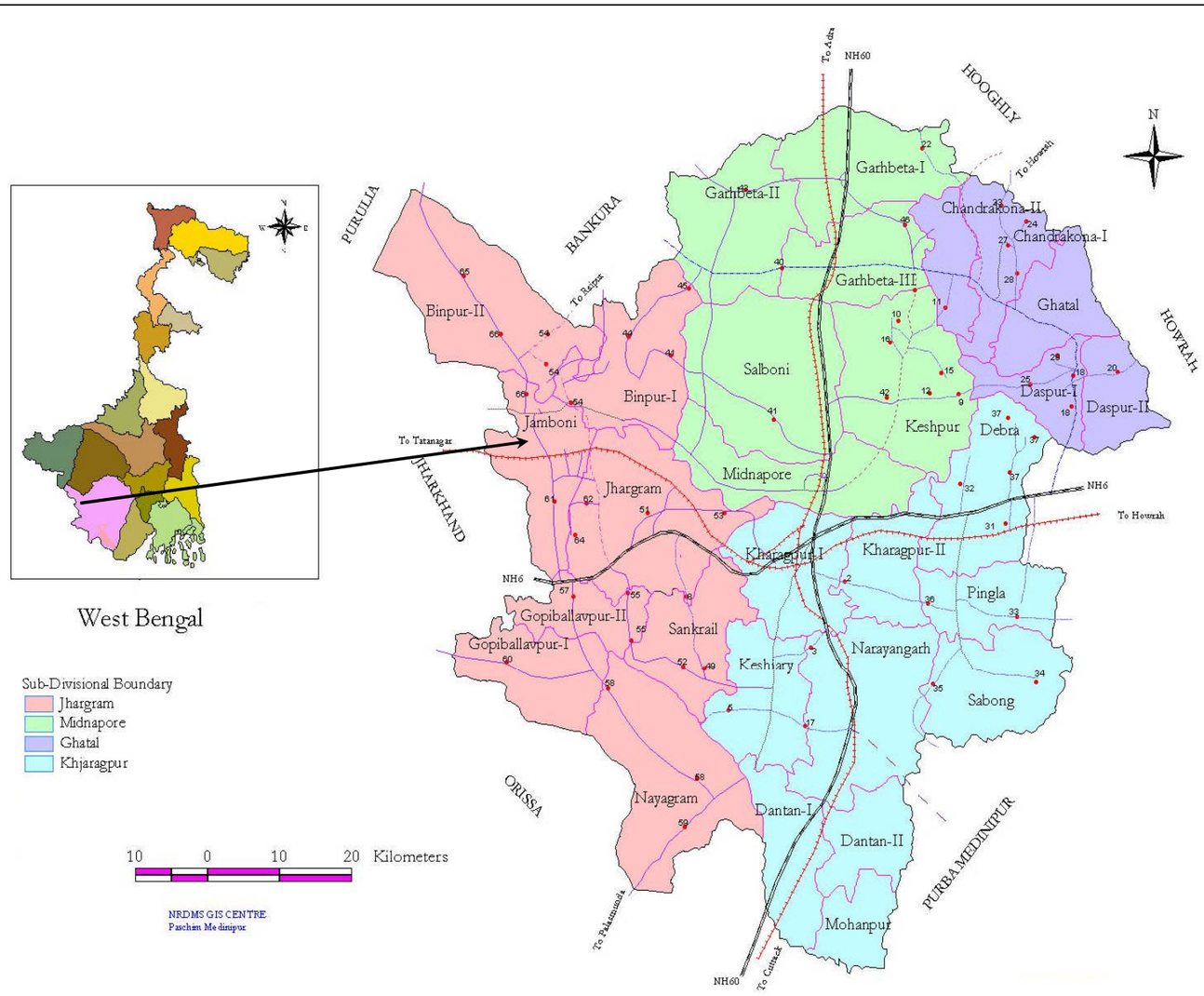
In West Midnapur district, the survey was conducted in Jamboni block. Four villages were selected for this research – these are Dakshinsol-Bhaluka, Harinaganj, Kendua and Shushni (Fig. 3.5). Although, Salboni and Garhbeta are the most renowned area in terms of NTFPs availability in the District, Jamboni block is not at all negligible in terms of NTFPs harvesting and marketing. The Jhargram Divisional Forest Office recommended the researcher not to visit Salboni or Garhbeta because of increasing Maoist activites. The condition of Jamboni block was comparatively better. NTFPs harvested in Jamboni block are supplied to Jhargram and Kharagpur towns by mobile agents and middlemen on a regular basis.

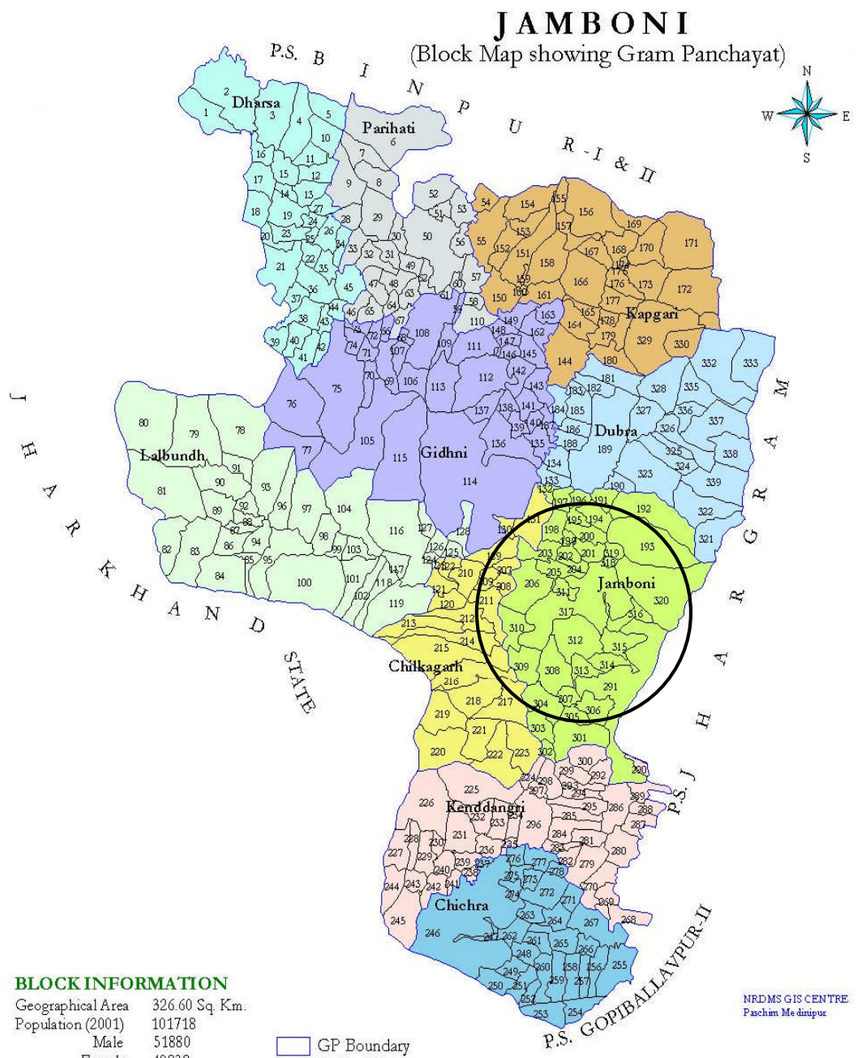
The climatic condition of the Block is quite similar to Arsha block of Purulia district and Ranibandh block of Bankura district. Physiographically, however, the Block is on the plain land with an unfertile barren surface. It is because of the physiographic variances in Purulia and Bankura districts, Sal dominated forest with miscellaneous species as well as miscellaneous forests are common. Therefore, the type of NTFPs is also higher. On the other hand, in West Midnapur district mainly Sal dominated forests are found and the range of NTFPs is also less.

Except for Kendua village, all other villages surveyed for this research are located within the forests, but forests are mostly scattered. Scheduled tribes as well as other backward class (OBC)[9] people are living together in these villages. The collection of Sal leaves for Sal plate making is one of the most important businesses for these forest fringe dwellers. In Jamboni block, there are some small scale and cottage industries; people can go for wage labouring jobs in towns such as Jhargram or Kharagpur, but at least one household member from each family goes to the forest everyday to collect Sal leaves. The scenario is similar in all four research villages (Appendix 4).

There is no LAMPS or any other NGO-run storage or marketing centre in the Block. Mobile agents collect NTFPs from these villages, sometimes forest villagers also go Jhargram town to sell their products. Some value-added products (mats from Date leaves, alcoholic drinks from *Bakhar*, machine-made Sal plates etc) are produced and sold by these forest villagers at the local market from where middlemen purchase them. These villages were selected for the research because of the availability of NTFPs, dependence of forest fringe dwellers (especially tribals) on forest products and the strong presence of middlemen in the NTFPs business. Detailed information about these blocks and villages is given in Appendix 4.

[9] "The Other Backward Classes (OBCs) in India are a group of citizens other than the Scheduled Castes and the Scheduled Tribes ... The list presented by the commission is dynamic and will change from time to time depending on Social, Educational and Economic factors... OBCs are described as "socially and educationally backward classes", and government is enjoined to ensure their social and educational development."
(Source: http://dictionary.babylon.com/other%20backward%20class/, cited on 12th July 2009)





BLOCK INFORMATION

Geographical Area	326.60 Sq. Km.
Population (2001)	101718
Male	51880
Female	49838
SC	15.44 %
ST	29.77 %
Literacy Rate	67.02 %

ADMINISTRATIVE UNITS

Police Station	1
Gram Panchayats	10
Gram Sansad	83
Total Mouza	388
Inhabited Village	283

GP Boundary
Parihati GP
Lalbundh GP
Kenddangri GP
Kapgari GP
Jamboni GP
Gidhni GP
Dubra GP
Chilkagarh GP
Dharsa GP
Chichra GP

Fig. 3.5: Research area in Jamboni block of West Midnapur district

Source: NRDMS, West Midnapur

Chapter 4

Sources and methodologies

4.1 Introduction

In this chapter, sources and methodologies used in the thesis will be discussed. Qualitative as well as quantitative methodologies were used not only to collect data but for the analysis of those data. The techniques for the analysis of data, ethical issues and problems faced during fieldwork are also examined here.

According to Devereux (1992),

> "Fieldwork begins at home, not in the research site. By the time any researcher arrives in the chosen village (or district, market, or town), a number of decisions have already been made that will greatly influence the subsequent research." (Devereux, 1992, p. 4)

For this research, the collection of qualitative and quantitative data and information, both primary and secondary sources received equal priority. To analyse primary and secondary data, qualitative as well as quantitative methodologies have been used concurrently.

4.2 Sources of data and information

4.2.1 Secondary sources

This research started with detailed archival work at the British Library, London. Archival research provided data and information on NTFPs and forest livelihoods of pre-colonial and colonial Bengal and presented an historical context. Although, there is no official record or document on pre-colonial forest livelihoods and the effects of NTFPs on them in the Presidency of Bengal, the books, articles and correspondence of different forest officers of the British colonial government in India (such as Ribbentrop, 1900; Gibson, 1856 and Brandis, 1864) were consulted. The researcher has also read articles, related to the research topic, by the then local kings, landlords (*Jaminder*), academics or eminent scholars and international visitors such as Fa Hien and Xuanzang. The annual 'Revenue Reports', 'Forest Reports' (1865 - 1940), the letters and papers written by forest officers to the British Government, the correspondence/articles written by several forest officers including the Inspector General of Forest in India and the '19th Century British Library Newspaper' archives

were checked to analyse the forest livelihoods and NTFPs policy of the colonial Bengal. 'The Times Digital Archive 1785 – 1985' was also used in this regard.

To analyse the post-colonial features of forest and NTFPs of West Bengal, the State Government's annual Forest Reports, the West Bengal Forest Development Corporation (WBFDC) annual reports (1990 – 2007) and the West Bengal Tribal Development Cooperative Corporation Ltd. (WBTDCC) annual reports (1990 – 2005) were examined. Only a limited amount of relevant previous research has been done on NTFPs and forest livelihoods in east Indian states (by Malhotra, 1993; Mitchell *et al.* 1999; Mahapatra *et al.*, 2005; Corbridge and Kumar, 2002; Corbridge *et al.*, 2004; Jewitt, 2002a). Therefore, during the analysis of NTFPs and forest livelihoods of the research area, in addition to the annual reports of different government organisations, previous project reports by organisations such as Indian Institute of Bio-social Research and Development (IBRAD) and National Afforestation and Eco-Development Board (NAEB) have been consulted. Books and articles on NTFPs and forest livelihoods in third world countries, web maps, web journals and newspaper articles have been referred to as the source of secondary data and information.

For the identification of villages and households targeted for semi-structured interviews, different types of maps were used. To get a clear view of the socio-physical features of the sampled villages, land-use and land-cover maps (including forest cover), hydro-geomorphological maps, drainage and water-body maps and soil maps were referred too. For this purpose offices such as the State Remote Sensing Centre (Department of Science and Technology, Government of West Bengal), the National Bureau of Soil Survey and Land Use Planning (NBSSLUP), All India Soil Survey and Land Use (AISS) and Forest Survey of India (FSI), Kolkata were contacted.

Topographical maps of the Survey of India at the scale of 1:25,000; 1:50,000 and 1:250,000 were used during fieldwork. The National Atlas and Thematic Mapping Organisation (NATMO) published the 'District Planning Map' of Bankura, Purulia and Midnapur districts in 1990s using remote sensing technologies. All these maps were made at the scale of 1:250,000 and these maps were also used during the period of fieldwork.

Midnapur district was divided into two separate districts (East Midnapur and West Midnapur) on 1st January 2002. As most of the open or protected forest areas are in the district of West Midnapur, the fieldwork was arranged in West Midnapur. However, in the 'Annual Forest Report - 2005' of West Bengal both districts have been considered as one district and all data and information related to forests have been considered as of Midnapur district only, so for this research, data and information on Midnapur district as a whole was used (as it was

before 1st January 2002). Census data (which includes socio-economic information on households) and the voting list were also useful sources for the selection of participants to be interviewed. Census data also provided information on the nature of landholding and occupation of the interviewees.

4.2.2 Primary sources

For the collection of primary or empirical data and information, mainly qualitative methods were used. These included semi-structured interviews, focus group discussions and elite interviews. Semi-structured interviews were arranged with forest dwellers and NGO staff (who were involved in NTFPs harvesting in dry-deciduous forest area in the State). To get data and information from forest officers, different types of interviews were arranged. Questionnaires were used for the household survey among forest dwellers to obtain qualitative as well as quantitative data.

In addition to these methodologies, participant and direct observation as well as participatory appraisal were undertaken to get information on the collection, storage and marketing of NTFPs at the grassroots level. They were also helpful for analysing the impacts of NTFPs on forest livelihoods. Primary data and information were collected from the three case study districts of West Bengal where the greatest amounts of open and protected forests are found and the dependence of forest dwellers on NTFPs were also noticeable.

4.3 Methodologies for primary data collection

The selection of methodologies for any research depends on several factors such as: the nature of the research, objectives of the research, the direction and/or the perspective of the research and the position of the researcher vis-à-vis the researched community and interviewees (Heyer, 1992; Marshall and Rossman, 1999; King, 1994; Grix, 2004). Due to the nature and type of the research topic and participants, primary data and information were collected using mainly qualitative methodologies including interviews and participant observation techniques.

Semi-structured interviews, elite interviews and focus group discussions are used in this research for generating more qualitative information whereas questionnaires are used to gather mainly quantitative data from forest dwellers (Appendix 1). Finally, both qualitative and quantitative data are compared to obtain a more accurate picture of the contemporary situation regarding NTFPs and forest livelihoods in the dry-deciduous forests of West Bengal.

Table 4.1: Methodologies used for empirical data collection			
Interviews		Interviewees and places visited for empirical data collection with date	
	Elite interviews	Founder Chairman of IBRAD (18-09-2008); Director, NAEB, Jadavpur University, Kolkata (19-09-2008); DFO, Purulia Forest Division (29-09-2008); PCCF, Government of West Bengal (20-10-2008); Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region (21-10-2008); APCCF, Govt of West Bengal (23-10-2008); Managing Director, WBFDC (24-10-2008); DFO, Jhargram Forest Division, West Midnapur (28-11-2008)	
	Semi-structured interviews	Assistant Managing Director, WBTDCC (16-09-2008); Middlemen, Sirkabad, Arsha range (23-09-2008); Ranger, Arsha range, Purulia (24-09-2008); Medicinal plant specialist, Arsha range, Purulia (24-09-2008); Villager, Bhuda village, Arsha range, Purulia (26-09-2008); ADFO, Purulia Forest Division (30-09-2008); C F, Working Plan & GIS, Dept of Forest, Govt of West Bengal (22-10-2008); Company Secretary & Chief Account Officer, WBFDC (24-10-2008); Vice President, WEBCON (31-10-2008); Forest guard, Ranibandh beat, Bankura (04-11-2008); Middlemen, Katiam village, Ranibandh range, Bankura (06-11-2008); Ranger, Ranibandh range, Bankura (06-11-2008); ADFO, Bankura South Forest Division, Bankura (07-11-2008); C F, Research and Development Wing, Dept of Forest, Govt of West Bengal (12-11-2008); ADFO, Jhargram Forest Division, West Midnapur (27-11-2008); Ranger, Jamboni range, Jhargram Forest Division, West Midnapur (10-12-2008); Staff, Forest Training Centre (FTC), Jhargram, West Midnapur (15-12-2008)	
	Group discussions	JFM wing, Ramakrishna Mission Lokasiksha Parishad (16-09-2008); NAEB, Jadavpur University, Kolkata (17-09-2008); Forest staff, Arsha forest range office (24-09-2008); Jamdaha villagers, Ranibandh, Bankura (04-11-2008); Barudi villagers, Ranibandh, Bankura (05-11-2009); Katiam villagers, Ranibandh, Bankura (06-11-2008); Dakshinsol-Bhaluka villagers, Jamboni, West Midnapur (12-12-2008); Harinaganj villagers, Jamboni, West Midnapur (04-12-2008); Kendua villagers, Jamboni, West Midnapur (14-12-2008); Shushni villagers, Jamboni, West Midnapur (15-12-2008)	
Questionnaires survey		Arsha range, Purulia Forest Division, Purulia	Bhuda village (Hh-15) – 22-09-2008 – 25-09-2008; Sirkabad-Bhelaidih village (Hh-16) – 26-09-2008 – 05-10-2008; Kalaboni village (Hh-14) – 06-10-2008 – 10-10-2008; Gurahata village (Hh-15) – 11-10-2008 – 15-10-2008
		Ranibandh range, Bankura South Forest Division, Bankura	Jamdaha village (Hh- 20) – 25-10-2008 – 31-10-2008; Barudi village (Hh-20) – 01-11-2008 – 06-11-2008; Katiam village (Hh-20) – 08-11-2008 – 11-11-2008
		Jamboni Range, Jhargram Forest Division, West Midnapur	Dakshinsol Bhaluka village (Hh-15) – 15-11-2008 – 26-11-2008; Harinaganj village (Hh-15) – 01-12-2008 – 06-12-2008; Kendua village (Hh-15) – 07-12-2008 – 11-12-2008; Shushni (Hh-15) – 15-12-2008 – 20-12-2008
Participation-observation and participatory appraisal		Arsha range, Purulia Forest Division, Purulia	Bhuda village (22-09-2008 – 25-09-2008), Sirkabad-Bhelaidih village (26-09-2008 – 05-10-2008), Kalaboni village (06-10-2008 – 10-10-2008), Gurahata village (11-10-2008 – 15-10-2008)
		Ranibandh range, Bankura South Forest Division, Bankura	Jamdaha village (25-10-2008 – 31-10-2008), Barudi village, (01-11-2008 – 06-11-2008), Katiam village (08-11-2008 – 11-11-2008)
		Jamboni Range, Jhargram Forest Division, West Midnapur	Dakshinsol Bhaluka village (15-11-2008 – 26-11-2008), Harinaganj village (01-12-2008 – 06-12-2008), Kendua village (07-12-2008 – 11-12-2008), Shushni (15-12-2008 – 20-12-2008)

Using these methodologies, a wide range of data and information were generated which cover many aspects of forest dwellers' livelihoods and their dependence on NTFPs. The survey was not designed to explore any data or information regarding the hunting or

gathering of animal products as the collection of animal products is illegal in the research area (Mahapatra *et al.*, 2005). It was quite difficult to discuss human feelings, their understandings of the surrounding environments and their daily lifestyle using strictly regulated quantitative methodologies only (Mason, 2003). It is for this reason that the collection and analysis of data and information using qualitative as well as quantitative methodologies were also used.

4.3.1 Questionnaires

Questionnaire (Appendix 1) surveys were conducted among forest dwellers mainly for the generation of quantitative data. Through such surveys, a large amount of data were generated in a fairly short period of time. Some open questions, which generated qualitative data, were included in the questionnaire to share forest dwellers' opinions on the research topic. Questionnaires were used in eleven villages, four from Purulia and West Midnapur districts and three villages in Bankura district. One hundred and eighty households, a minimum of fifteen from each village, were selected for this purpose. Households were selected based on their socio-economic status and forest dependence. Households included scheduled caste, scheduled tribe as well as other people live within forest area.

Those forest villages with the highest numbers of households dependent on NTFPs, were given priority for selection in the survey. The distance of villages from forest areas, as well as from the nearest market (from where local merchants collect NTFPs from forest villagers) was also taken into consideration. Gender divisions, regarding the collection of NTFPs, received special attention; because a large number of women and children are exclusively involved in the collection of some specific NTFPs. As older forest people may have better knowledge of medicinal plants than younger ones, the cross section included different age groups to enable the collection of different levels of knowledge.

Questionnaire surveys were arranged throughout the day and in the evening so that all types of household members could take part. During the monsoon, a large number of forest dwellers undertake agricultural work, as wage labourers, away from their home in the same district or even in the other districts, so the volume of their NTFPs collection falls considerably. However, during late autumn, the greater amounts of NTFPs are collected from the local forests. That is why the questionnaire surveys were started from the end of monsoon (22nd September 2008) and continued until winter (22th December 2008). This long fieldwork period was also useful in providing information on the different features of NTFP harvesting and its effects on forest livelihoods in different seasons.

Although questionnaires generate a large amount of data within a short period of time (Grix, 2004), there are some limitations in using this technique. For example, respondents may not give their opinions or thoughts in a flexible way if most of the answers are of the 'yes' or 'no' type. To solve this problem, semi-structured interviews and focus group discussions were arranged where participants were able to share their ideas using their own words.

4.3.2 Semi-structured interviews

Semi-structured interviews were used to collect qualitative data and information for this research. This type of face-to-face interview is useful in remote villages of the Global South (King, 1994; Heyer, 1992). For example, Judith Heyer (1992) noticed during her fieldwork in Kenya in 1961–62 and in India in 1981–82 that the, "rural people like to being interviewed far more than might be thought, and ... people frequently asked to be interviewed if they were not on the list" (Heyer, 1992, p. 208).

Semi-structured interviews were chosen because: first, they do not follow any rigid or specific order so the researcher could conduct each interview in a flexible way (Hay, 2000). Second, the use of a pre-formatted list of questions allowed all key research topics to be covered, but at the same time, new questions as well as topics, related to the research area, could also be discussed. Finally, interviewees could share their own feelings freely in their own words instead of providing only 'yes' or 'no' type answers, which usually happened in the case of questionnaire surveys.

Fig. 4.1: Semi-structured interviews with the Conservator of Forest (left), Government of West Bengal (22-10-2008); Vice-president (middle) of WEBCON (31-10-2008) and Chief Account Officer of WBFDC, Kolkata (24-10-2008)

For this research, semi-structured interviews were held with forest villagers, villagers who have knowledge about medicinal plants, intermediaries, who are involved in NTFPs business at the ground level (Fig. 4.2) and Forest Department staff (Fig. 4.1). Seventeen semi-structured interviews were arranged. In this case, interviewees were able to share their own

ideas and knowledge in a flexible and informal environment. Answers were noted down at the time and simultaneously taped (with the interviewees' permission).

Female, male and child household members were all encouraged to participate in the interviews. Children from forest communities (especially tribal) play an important role in the collection, storage and marketing of NTFPs. Although, children took part in the interview with their elder family members, they were always given an opportunity to express their own opinion. During interviews with elderly people and children, ethical issues (such as their identity, ethnicity, comments, security etc.) were considered with special importance.

Fig. 4.2: Semi-structured interviews with medicinal plant specialist (left) from Gurahata village (24-09-2008), local mobile agents for NTFPs (middle) from Sirkabad village (23-09-2008) and Bhuda villagers (26-09-2008) in Purulia district

Photo: Ghosal, S.

To overcome the language problem between researcher and interviewees, an interpreter was used from each researched community. The interpreter(s) had good knowledge of the native language as well as Bengali or English, thus the comments from local people were translated word for word just after the interviews. Interpreters, however, also helped the researcher to break the ice between the researcher and forest villagers as interpreters were mostly from the researched villages. According to Devereux and Hoddinott (1992) and Heyer (1992), apart from translation interpreters also help in other ways:

> "The main advantage of working with an interpreter – someone whose responsibilities are confined to translating – is that the field worker enjoys fairly direct contact with respondents, while retaining some flexibility (to write and think) during interviews." (Devereux and Hoddinott, 1992, p. 26)

However, it is also true that the presence of an interpreter sometimes made respondents 'more reserved and less talkative' as Shahrashoub Razavi (1992) noticed during her field work in Iran in 1988-89. Therefore, mostly young people from forest communities, who were

college students and had very good relationships with other forest villagers and knowledge about the forest community, were selected as interpreters for this research.

Account has to be taken of some limitations associated with semi-structured interviews. First of all, interviewees sometimes avoided answering questions or providing incorrect information on sensitive issues. For example, some NTFPs are nationalised, so forest people cannot collect these products without government permission. However, forest people sometimes collect these products illegally. Therefore, forest dwellers have avoided answering questions about the collection, storage and marketing of these particular NTFPs. For information regarding these products, the researcher had to ensure respondents that their identity would not be revealed. It was a very hard task to convince respondents but the researcher put his best endeavour with sincerity to overcome this hurdle. A similar type of problem also arose in the case of semi-structured interviews with Forest Department staff, middlemen and NGOs staff.

Second, semi-structured interviews were mainly targeted to gather qualitative information. Although, the researcher tried to have an interpreter from each research community who had a good knowledge of the native language as well as of Bengali or English, this language issue produced a gap between the researcher and the research group. The interpreter sometimes used his own words, particularly if he was a keen supporter of a political party, which did not exactly reflect what the interviewee said. Care was taken in the interpretation of the information to ensure that this type of bias was reduced to a minimum.

The poor transportation system within forest areas was another problem. Semi-structured interviews were time consuming so it was very difficult to complete the anticipated number of interviews in the more remote villages. The fieldwork was started in the month of September which is the rainy season in West Bengal. The muddy forest paths become very difficult to follow. Within the villages, the researcher mostly walked and when travelling from one village to another a lightweight two wheeler was used. The driver and the two-wheeler were hired from the Forest Department.

Finally, as Heyer found (1992, p. 208), “it is obviously vital to keep interviewees interested and concentrating on the subject matter. This is more difficult … if the interviews are long and tedious”. Therefore, the researcher tried to make semi-structured interviews as short as possible, but covering all the research objectives. To obtain the interviewees’ personal ideas and thoughts, only the most relevant issues were discussed for saving time. For example, some issues are well-known to Forest Department staff, which may not be relevant to forest

dwellers. Therefore, questions were asked according to the interests and knowledge of the interviewees.

4.3.3 Focus-group discussions

Focus group discussions are similar to semi-structured interviews, but here a small group of people take part at the same time. During focus group discussions, the researcher works more as a moderator than as an interviewer (Goss, 1996). Focus group discussion is one of the most frequently used techniques for market studies. It is, however, also used as an important methodology for social science research in general (Marshall and Rossman, 1999). Following the ideas of Foulkes (1948-1983) on the importance of focus group discussion in geography, Hoggart *et al.* (2002) considered that,

> "…a carefully constructed [focus] group discussion could replicate social relations and interactions. This is because communication within the group becomes multidimensional, intra-personal, interpersonal and transpersonal. This means that dialogic interaction can have meanings for an individual, between individuals, and for the group as a whole. As a result, group responses are more than the sum of individual responses; during conversation one set of ideas can set off other thoughts and exchanges." (Hoggart *et al.*, 2002, p. 213)

Focus group discussions were used in this research for several reasons. First, focus group discussions were normally arranged in a more relaxed environment compared to one-to-one semi-structured or elite interviews and participants felt and acted more naturally in this case. Second, this type of discussion created an opportunity to gain additional data and information that the researcher had not considered before the arrangement of discussions. Third, through such discussion, several common ideas and opinions have been revealed on complex topics. Fourth, as most of the participants in a focus group discussion were from the same background they were happy to discuss the same topic from different points of view. This provided extra information for the research topic. Through group discussions, sample size has also been increased in a limited period of time (Krueger, 1988). Finally, for 'argumentive discussions' the focus group worked as a very popular methodology as it generated new and unexpected information. That is why Devereux and Hoddinott (1992, p. 31) remarked, "[focus] Group interviews are very useful as a kind of brainstorming, which fills in background information".

For this research, ten focus group discussions were arranged. These were one each for the NAEB and Ramakrishna Mission Lokasiksha Parisad and forest staff of Arsha forest range

office (Purulia district). Seven focus group discussions were organised with forest dwellers, three in Bankura district and four in West Midnapur district (Fig. 4.3). There were between five to ten participants in each group.

Officers from different departments of the NAEB and Ramakrishna Mission Lokasiksha Parisad were invited to take part in focus group discussions. For example, Ramakrishna Mission Lokasiksha Parisad has several departments such as JFM Wing, marketing of NTFPs, agri-horticulture, Lac cultivation etc. Therefore, experts from each department were requested to take part. In the case of village groups care was taken to ensure a balanced age-sex ratio (Fig. 4.3). Forest dwellers that were highly dependent on NTFPs for domestic as well as economic purposes were selected for the group discussions.

Each focus group discussion ran from an hour to two hours. Open questions were discussed during this time. The topics of discussion were disclosed to all the group members in advance so that they could be prepared. All focus group discussions were recorded and later transcribed. Important points had also been taken as notes during discussions. The researcher tried to minimize the problems associated with focus group discussions. According to Goss (1996), the lack of confidentiality and discussion on sensitive issues in a mixed age-sex group sometimes creates problems. The researcher avoided discussion on any confidential issue. Sensitive issues (such as age-sex issues regarding the harvesting of NTFPs) were normally discussed during one to one semi-structured interviews.

Fig. 4.3: Group discussion participants from Shushni village (left) of West Midnapur district (15-12-2008) and Jamdaha village of Bankura district (04-11-2008)

Photo: Ghosal, S.

It was very common that some of the participants took a more active role than others. Therefore, the researcher attempted to give all the participants an equal opportunity to express their own ideas. The researcher provided all the focus group participants with a preformatted sample of questions; which were discussed during focus group discussions. This helped participants to take preparations in advance. However, not all the participants

viewed the focus group discussions with equal importance. To solve this problem, the researcher tried to make all participants understand the importance of the research from the perspective of forest preservation and forest livelihoods. To discuss all the research topics with equal importance the researcher had to manage time carefully from the start of the discussion. Sometimes an assistant was also recruited from the same community to help the discussion.

Another problem was organisational: it often proved difficult to bring together all NGO officers from different departments of the same office. The researcher had to contact all the participating officers in advance to arrange a place and time to meet.

4.3.4 Elite interviews

The elite interview is another important type of interview. The nature of such interviews is quite similar to that of a face to face semi-structured interview (King, 1994). This type of interview is arranged with an 'elite' person, who has a good knowledge of the research topic. The elite interviewee is in a position to provide a huge amount of data and information to the researcher in a very short time. There are several advantages of elite interviews. For example, the higher position of the interviewee in any social, cultural, economic or administrative organisation means that they have access to important and confidential data and information. Second, from the elite interview, it is quite easy to get historical perspectives on the topic. At the same time, the present situation and future plan of the community or organisation on the research topic can be discussed. Therefore, from this type of interview, an overall idea can be generated in a limited period of time (Marshall and Rossman, 1999).

Fig. 4.4: Elite interviews with the PCCF (left) of West Bengal (20-10-2008) and the Deputy Director in Charge of the Regional Office of Forest Survey of India, Kolkata (21-10-2008)

For this research elite interviews were organised with the Principal Chief Conservator of Forest (PCCF), Government of West Bengal; Additional Principal Chief Conservator of

Forest (APCCF), Government of West Bengal; Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region (Fig. 4.4); Director of WBFDC; Director of WBTDCC; Founder Chairman of IBRAD; Director of NAEB (Fig. 4.5) etc. A total of eight (8) elite interviews were conducted during fieldwork. A semi-structured questionnaire was used as a guideline during elite interviews. The type, nature and structure of the questionnaire, however, was different to that of semi-structured interviews. Interviews were recorded and, at the same time, notes were taken for further analysis.

Fig. 4.5: Elite interviews with the Founder Chairman (left) of IBRAD (18-09-2008) and the Director of NAEB, Kolkata (19-09-2008)

As with semi-structured interviews and focus group discussions, there are some limitations to elite interviews as well. First of all, it was quite difficult to make contact with elite people because of their busy schedules. Therefore, the researcher tried to get appointments with them as early as possible. Before conducting the main fieldwork, the researcher had already discussed the theme and importance of the research with some of the elite interviewees which was beneficial in setting up the elite interviews.

Second, elite people sometimes were not ready to answer questions that represented sensitive issues for them. Occasionally, elite people tried to hide the negative features of their organisation and focused on the positive activities only. To solve this problem, a lot of cross checking were undertaken to make sure that the information provided by the elite people was correct. Before the arrangement of elite interviews, the researcher studied the academic and working backgrounds and experiences of the interviewees.

Third, elite people normally possess a good knowledge about their organisation or community, but sometimes it was hard to prevent the discussion from moving towards irrelevant topics, which had no relation to the research topic. For example, instead of discussing the development of forest livelihoods based on NTFPs, sometimes elite interviewees were discussing their success and future plan for forest and wildlife

conservation and how forest cover is increasing all over the State. To overcome such problems, a preformatted guideline was used, containing a few questions related to the research topic. It saved a lot of time and minimised the bias.

Finally, the power and positionality of the interviewee also produced problems during the elite interviews. As a post-graduate researcher it was quite difficult to challenge elite people, even if they were being irrelevant. Sometimes informal discussions with elite people were also useful in collecting additional information.

4.3.5 Participant and direct observation

The methods of participant and direct observation were first developed through the studies of 'cultural anthropology' and 'qualitative sociology' (Marshall and Rossman, 1999). The idea of *verstehen* ("to be aware of") by Dilthey and Weber has enriched this technique for the study of 'social phenomena' (Evans, 1992). Presently it has been considered as the 'principle of reflexive explanation', which could be the basis of all qualitative methodologies where the social science researcher works to be part of the research topic. The researcher not only gets the data or information from respondents, during questionnaire surveys or interviews, but at the same time can also study the surrounding environment which is affecting the main research topic. They can also analyse time, space and other influential factors which are not possible to imagine through the words of interviewees (Francis, 1992).

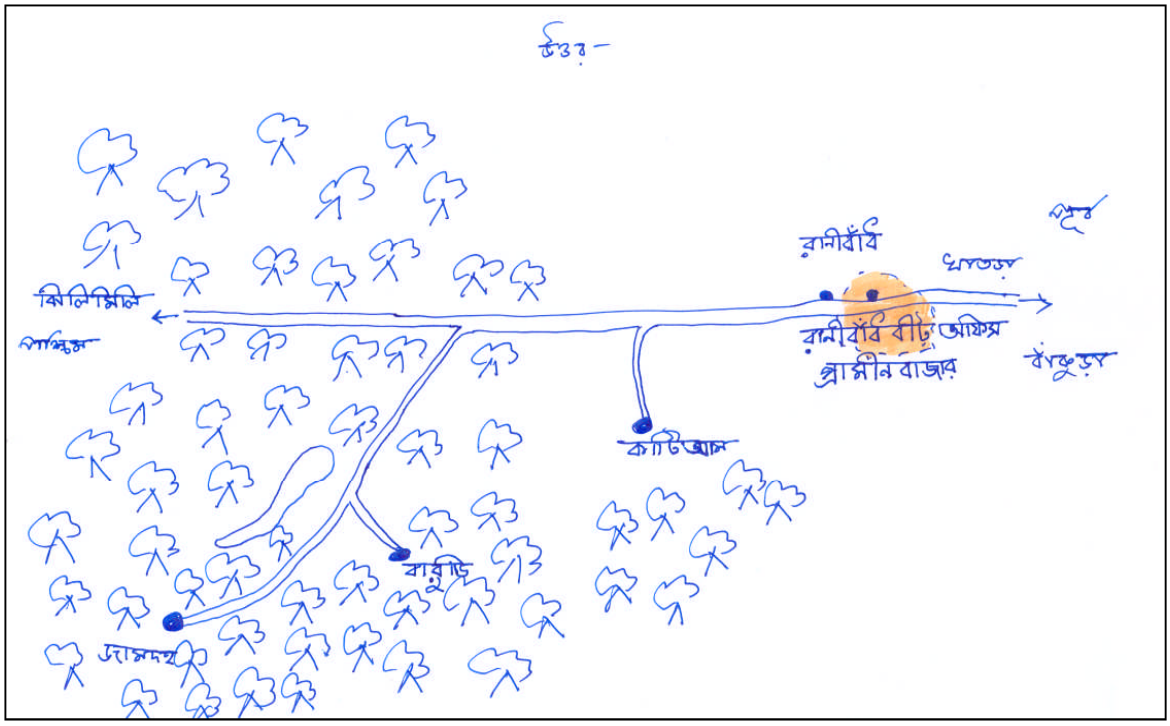
During participant observation, the researcher has the opportunity to comprehend the real situation by direct involvement in the research topic. Using this technique, the researcher gains first-hand knowledge on the research topic. Elizabeth Francis (1992) realised during her PhD fieldwork in Kenya, that participant observation was a useful method to know an organisation or community in a better way.

Through direct observation, on the other hand, the researcher has an opportunity to record and note the real phenomena directly without actively getting involved in them. During participation, the researcher uses himself as a tool of methodology (Delamont, 2007). The main reason for the arrangement of participant and direct observation in this research was that the researcher could gain down-to-earth knowledge on the research topic during the fieldwork. The data and information collected through participation and observation were very relevant and could be compared with other sources of information (Evans, 1992).

During the course of the questionnaire survey and semi-structured interviews among forest dwellers, participation and direct observation was carried out to analyze the collection,

storage, processing and marketing of NTFPs by forest dwellers at the village level and to investigate how NTFPs were related to their livelihoods. Planned observations included watching each member of a household go to collect NTFPs, how they collected and stored them and how they sold their collected NTFPs to middlemen or supplied to LAMPS and WBFDC. This technique was also helpful for producing maps on the basis of gender differences regarding the collection of NTFPs, types of NTFPs collected by different aged group and the areas from where different types of NTFPs were collected by different family members (Fig. 4.6). How NTFPs get 'added-value' by the forest people was also investigated along with the uses of NTFPs for different households (including socio-cultural) purposes and for cash income.

Fieldwork commenced during the monsoon (from 22nd September), which is considered the lean season for the collection of NTFPs and continued until winter when large amounts of NTFPs are collected from the dry-deciduous forests of West Bengal. The main limitation of participant and direct observation was that they were very time-consuming tasks, so it was quite hard to study in detail all the aspects of forest livelihoods based on NTFPs within the scheduled time.



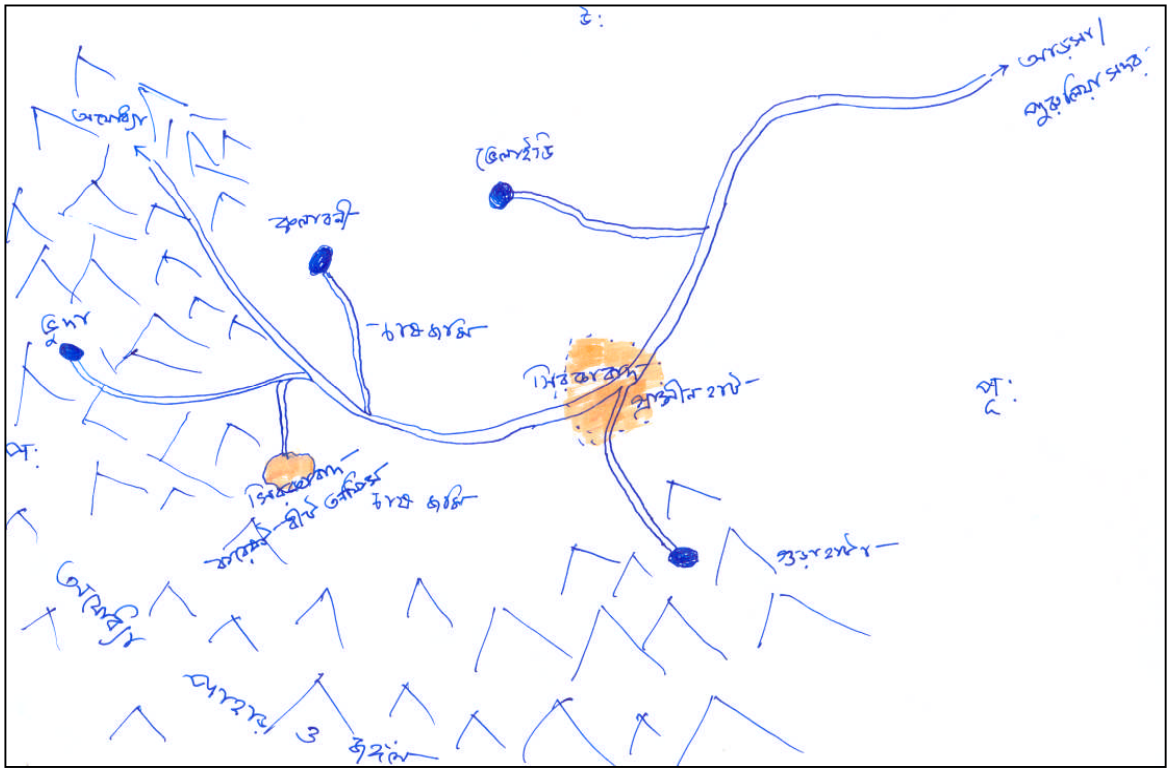


Fig. 4.6: Maps drawn by Barudi villagers of Bankura district and Bhuda villagers of Purulia district during participatory appraisal

Photo: Ghosal, S.

Second limitation with the methodology is that the researcher has to work with a neutral mind (impartiality) and note down the factual phenomena. It is because of this limitation, some social scientists do not consider this methodology to be scientific (Evans, 1992). However, a first-hand intensive study of the research community normally provides extra weight to the research findings. Third, during participant and direct observation, it was sometimes quite difficult to take notes. Therefore, the researcher had to keep the information in his memory until the end of the engagement. Some important words were noted down during breaks and a digital recorder helped to solve this problem.

Finally, during observation, it is sometimes difficult for the researcher to decide how, what and what not to observe (Delamont, 2007; Marshall and Rossman, 1999). To solve this problem in this project, the researcher conducted an extensive study on the research topic. For this purpose, related books, journal papers, research works on other Indian states were followed. Thus, the researcher was able to collect relevant data within the scheduled time.

4.3.6 Participatory Appraisal

The last methodology used for this research was participatory appraisal. This is an approach rather than a formal data collecting methodology. Here the researcher took a facilitating role. Forest villagers took an active part in each step of the research. Therefore, the power of conducting research was shared by the researcher and the research communities. The researcher has found some benefits to this approach. For example, during participatory appraisal, local people were involved in the research with their own perception. The researcher did not interfere when local people performed their activities. Using this technique, practical knowledge of forest communities was gained.

For this research, forest community members with different ages, genders and socio-economic statuses were encouraged to take part. To convince them to do so, the importance of the research in the context of their livelihoods was explained to them. It helped to make them interested in participating in the research. Forest dwellers were requested to draw a map of the area where they lived and from where they collect NTFPs on a regular basis and the nearest market, where they sold their collected products (Fig. 4.6). These maps were compared with data and information collected through questionnaire surveys, semi-structured interviews and direct observation.

The researcher also arranged for a ‘transect walk’ with forest communities when they went on their day-to-day collection for NTFPs and other forest products. Forest community members were asked to show the sites of important plants as well as different parts of those

plants from where NTFPs are produced. The areas from which female, male and child members collected NTFPs separately or together were discussed too.

At the end of the walk forest people were requested to rank the NTFPs based on their importance for household as well as commercial purposes (Fig. 7.4, 7.5 and 7.6). A video recording was made of the collection of forest products. The main objective of this approach was to comprehend grassroots level knowledge about NTFPs collection.

During participatory appraisal, a few problems were found. For example, sometimes collective issues got more focus than individual ones, so the researcher needed to encourage all the community members who were taking part to contribute their knowledge to the discussions. Some community members were not interested in participating in the research as they were busy with their usual activities.

For the organisation of successful participatory appraisal, the period during which the research takes place can play an important role in identifying relevant data. For example, for this research when participatory appraisal was arranged, some of the NTFPs were available to collect but others were not. To reduce the effect of seasonality, the participatory appraisal fieldwork was extended from the monsoon, which is considered the lean season for NTFP collection, until winter, when it is peak season.

Although there were some problems with this approach, it was still a very useful way to explore indigenous knowledges about the harvesting of NTFPs. Their techniques of mapping, ranking and subsistence use of NTFPs were all examined. The involvement of forest people in the research was helpful in reducing the gap between the researcher and the researched communities, which used their own voices and views within the participatory appraisals.

4.4 Ethical issues

In the case of fieldwork-based social science research, the most important ethical issue is the participants' engagement. Without cooperation from the researched community, it is hard to begin research. Therefore, for this research, the researcher always remained sensitive to the relationship between forest communities and Forest Department staff.

During the time of semi-structured interviews and participant-observation, the presence of elderly and child members created some ethical issues. The researcher was cautious in this regard. The researcher always maintained confidentiality according to participants' wishes in

the case of data collection and process. Any incident or phenomenon that could prove harmful for respondents has not been included in the research findings.

All issues concerning age, sex, community background, economic status and ethnic origin of respondents have been handled in a careful manner. The notions of ecology, ecosystem or environment amongst the research communities vary considerably compared to the knowledge of Forest Department staff. During the time of data analysis, confidentiality regarding these topics has been maintained. According to Miles and Huberman (1994),

> "Issues of privacy, confidentiality, and anonymity take a completely new turn when visual media (still pictures, video) are used in data collection and reporting. Individuals and groups still need to have control over how they are depicted, and can resist privacy invasions (e.g., via vetoing specific pictures or sequences), but the possibility of anonymity is almost surely gone, even with facial-blur special effects." (Miles and Huberman, 1994, p. 297)

In this research, data analyses are fair, justified and as honest as possible from the perspective of researched groups' ethical issues. International research guidelines as well as the university guidelines regarding ethical issues have been followed for this purpose.

4.5 Positionality

The identity and positionality of the researcher carried advantages as well as disadvantages during fieldwork. As the researcher was from the same State, it was easier to 'fit in' with researched communities during the participant and direct observation and participatory appraisal. It was also anticipated that forest people would rely on the researcher to reveal 'secret' information (such as medicinal uses) on NTFPs harvesting. However, this did not happen in practice. On the other hand, there was a possibility that forest dwellers might ignore the researcher and refuse to answer his questions. Sometimes they were concerned that they would not benefit at all from this research because the researcher is from the same State. When a foreign researcher undertakes fieldwork, forest people expect that their socio-economic condition might be revealed to world-renowned organisations and they will benefit financially.

4.6 Analysis of data

It is very difficult to analyse research findings using a single methodology as socio-cultural as well as economic transformations influence human-nature relationships considerably. It is very difficult to analyse any social phenomena and their effects on the environment following

any particular technique. Therefore, for the successful completion of a social science research, a number of approaches may be required (Hay, 2000). It also helps to compare the results achieved using different methodologies. In the context of changing human behaviour (based on surrounding socio-physical environments), qualitative methodologies are becoming more relevant compared to quantitative methodologies (Grix, 2004).

For this research, to analyse primary as well as secondary data and information, qualitative as well as quantitative methodologies were used simultaneously (Fig. 4.7). For the quantitative analysis of the collection, storage and marketing of NTFPs by the forest dwellers, SPSS and EXCEL software packages were used. Although quantitative methodologies analyse data in more scientific and systematic ways, it is very hard to analyse social phenomena using quantitative methodologies.

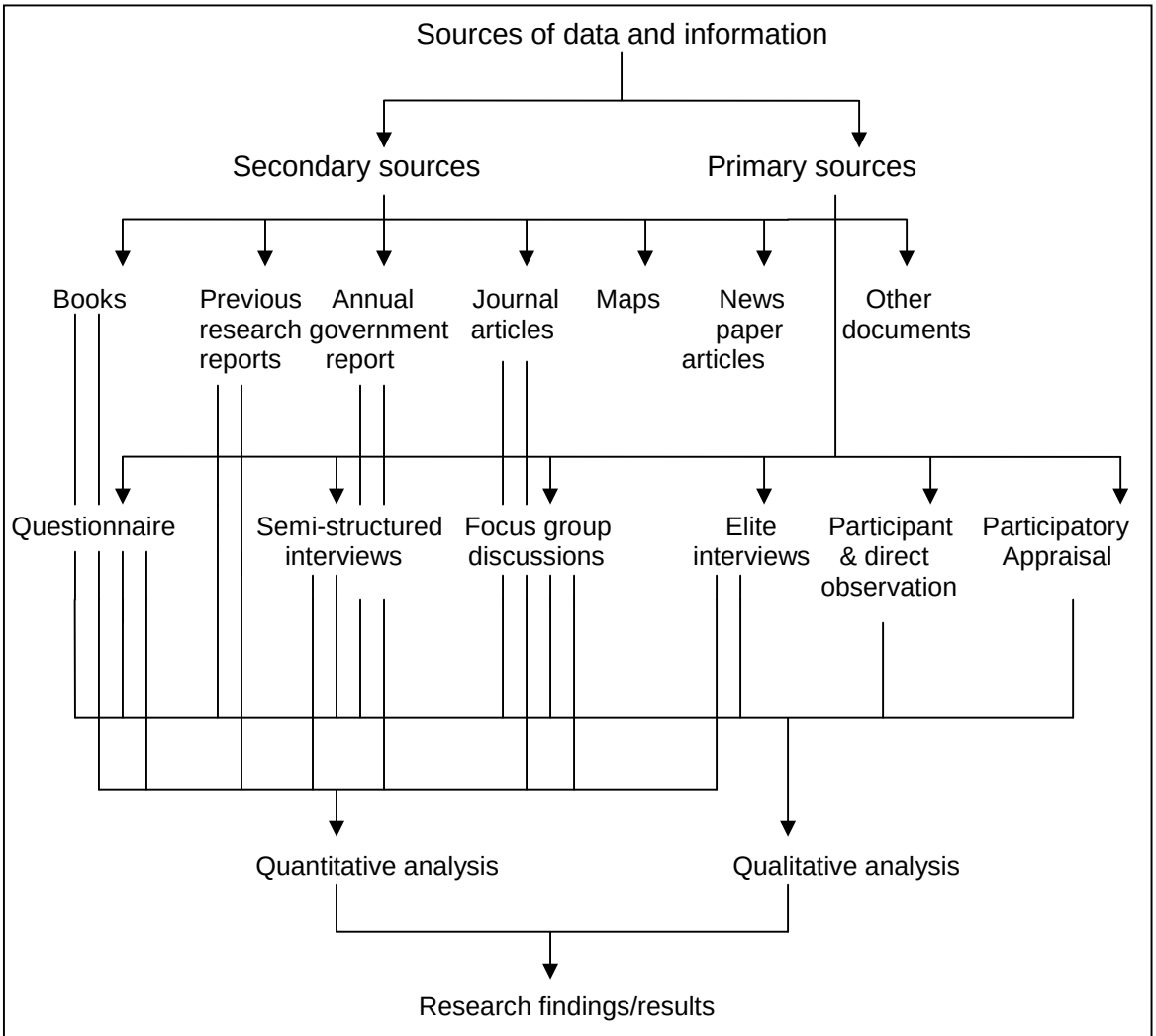


Fig. 4.7: Sources and analysis of data and information

Source: Ghosal, 2008

Qualitative methodologies, on the other hand, are used in a comparatively flexible way considering all social and natural phenomena, which affect human normal livelihoods (Miles and Huberman, 1994). Some social scientists, however, do not consider this method as scientific (Cassell and Symon, 1994). According to this group, qualitative methodologies cannot give rigorous results. In this case, the researcher can only interpret the comments of interviewees. It is hard to use strict mathematical or statistical models in the case of qualitative analysis (Grix, 2004). Sometimes qualitative and quantitative methodologies give quite distinct results for the same data and information. That is why it will be always difficult to make a balance between these two techniques for the analysis of data and information to get a relevant outcome for this research.

For qualitative data analysis, interpretation and coding were conducted. Interpretation includes the transcribing of interviews, which were arranged through semi-structured interviews, focus group discussions and elite interviews. Important comments of participants have been quoted during the time of data analysis. Comments of forest villagers were collected in the native languages (mainly Bengali and Santhali) and afterwards they were translated into English. Those quotations, used in the thesis, transcribed from Bengali or Sathali language to English have been written in 'italic'. Grammatical or compositional mistakes have also been corrected for those quotations, which were collected in English. Content analysis, micro analysis, discourse analysis as well as thematic analysis were also done to cross check the outcome. Software such as NVivo and NUD*ST could be useful during the time of qualitative analysis of data, however, for this research, these software were not used due to time limitations.

Photographs, videos as well as field-notes were taken during the time of participant-observation and participatory appraisal. All of these visual documents, as well as field-notes, were considered during data analysis to find out the differences between the actual situations and the interviewees' given information.

4.7 Conclusion and limitations of methodologies

A few general problems were raised during the period of fieldwork for this research. The problem of sampling villages or households is very common in the Global South. Like other social scientists working in developing countries, Wendy Olsen (1992) faced several sampling problems during her fieldwork in southern India. Therefore, before starting fieldwork, the researcher considered some issues carefully (such as, the socio-economic status, age-sex ratio and ethnicity of researched communities). Sampling was prepared after visiting the research area; however, after starting fieldwork, particularly in remote villages,

several issues (such as poor transportation, sudden increase of maoist acitivities in some areas, political turmoils etc) emerged which the researcher did not expect earlier. To minimise this problem, different types of maps, census reports, socio-economic survey reports were followed.

Social taboos and some cultural factors also raised difficulties during fieldwork. Many activities or discussions, which are not offensive to the researcher, proved annoying to forest communities. The researcher was afraid that further discussion of such issues might make forest villagers reluctant to continue further discussion. No topic was discussed during interviews with Forest Department staff, forest dwellers or middlemen, which could harm participants. Even when sensitive issues arose, the researcher was cautious about the circumstances so that the situation did not go out of control. During his fieldwork in Burkina Faso, Garry Christensen (1992) noticed that the concept of 'sensitivity' varied from one country to another and even from one community to another in the same country. This was also true for the communities of this research. Some communities consider some topics (such as collection of some forest products by female) sensitive, but others did not. Therefore, this aspect of fieldwork required careful negotiation.

For an intensive study of the forest livelihoods and the effects of NTFPs on it, the researcher stayed as close as possible to the researched communities; however, there were several environmental as well as anthropogenic problems, which forced the researcher to stay at the forest villages for relatively short space of time. During the last few years, Maoist activities have increased significantly in the Chhotanagpur plateau area including the districts of Bankura, Purulia and West Midnapur districts of West Bengal. Taking advantage of the poor economic condition of forest people (especially tribal people), Maoist leaders encourage them to join violent struggles in exchange for cash or commodities. The seasonal and climatic variations and the lack of basic facilities within most forest villages also created several problems during empirical data collection.

Chapter 5

Pre and post-colonial forestry and the importance of NTFPs

5.1 Introduction

This chapter is divided into several sub-sections which discuss NTFPs and forest livelihoods in Bengal in the pre-colonial, colonial and post-colonial periods. Results have been drawn on the basis of detailed archival research at the British Library, London and the present West Bengal State Government annual reports. Annual reports of WBFDC, WBTDCC have also been followed for this purpose.

5.2 NTFPs and forest livelihoods in pre-colonial India

From the Indian epic histories (e.g., the '*Ramayana'* and the '*Mahabharata'*) and mythologies, it is clear that many ancient Indian civilisations had a very close relationship with the forest. A dense forest covered much of the country and the original inhabitants were the aboriginal people whose livelihoods were based on hunting and gathering (Schlich, 1906). They not only lived there to collect forest-products for their daily household purposes, but also saw the forest as a safe and secure place to live. The Indus valley civilisation was urban based and would have depended on the destruction of forest resources to some extent for its existence.

> "…palaeobotanical evidences testify that there were dense forests in the country [*India*]. The Palaeolithic and Mesolithic men of India could not carry out felling of trees, but Neolithic men used stone axes to cut trees for constructing houses and other purposes. However, the negligible human population of that period hardly had any adverse effect on the forest wealth. About 4000 years BC, during the Indus valley civilisation, … use of burnt bricks and intricate drainage systems point out to the fact that people used wood from the forest for burning and that there used to be a heavy rainfall." (Upadhyaya, 1991, p. 114)

For the supply of food, accommodation, fodder, fuel-wood and even cosmetics (wild gems), the forest was an important source of subsistence for forest dwellers. They considered the forest as their beloved home offered by God almighty. It was clear to them that their lives entirely depended upon the survival of the forest.

> "There are evidence*[s]* of trees being worshiped and respected during this period [*later Vedic and Epic age*]. Deforestation was not advocated as it would result in poor rainfall.

> It has also been advocated that those who want progress in their family and wealth should not cut trees." (Upadhyaya, 1991, 115)

People of those days had a good knowledge about forests and the uses of forest products. They knew very well which products they should collect and how much they should collect. They were especially concerned about the protection and conservation of natural resources. This knowledge developed year after year through their practical experiences (Gadgil and Guha, 1992; Tewari and Isemonger, 1998; Kulkarni, 1983).

> "In ancient times forests were regarded as abodes of spiritual solace and the concept of preserving forests and wild life develop around the 'ashrams' (hermitages) of the sages. These forest-based ashrams propagated '*Aranya Sanskriti*' or a forest culture and human understanding of the fundamental ecological utility of forest ecosystems and their economic importance … Indian thought and culture flourished around the ashrams in our vibrant forests and provided the society with both intellectual guidance and material sustenance." (Rawat, 1991, p. 130-131)

In about 2000 BC, the Aryan people came to India. Their main occupation was pastoralism and agriculture so they cleared a considerable amount of forest cover of India for farming. The burning of Khundava forest by the Kshetriya people was, as described in the *Mahabharata*, 'the first semi-historical evidence' of forest destruction in India. In Rigveda, the evidence of using plants as medicinal herbs is available. For making agricultural implements, chariots, utensils as well as for household purposes, wood and non-wood products used to be collected throughout Vedic period (Rawat, 1991; Upadhyaya, 1991). However, Ribbentrop (1900) argued that it did not have a major impact on Indian forest or the forest dwellers, because little of the forest was destroyed. Even during the Brahminical and the Buddhist period, most of the country was covered with forest.

From the '*Arthashastra*' of Kautilya (350 BC - 283 BC) and '*Indica*' by Magasthenese (350 BC - 290 BC), it is found that the emperors Maurya (321 BC – 184 BC) and Gupta (280 – 550 AD) used to collect revenue from timber and non-timber forest products. They even had a well-organised Forest Department for the management of forest and forest products. Forest officers used to take initiatives to increase forest cover and forest products (Rawat, 1991). "In '*Arthashastra*' legal classification of forests has been given and three main classes of forests have been named as: (1) reserved forests, (2) forests donated to eminent Brahmans, and (3) forests for public use. Reserved forests were of two types: (a) reserved forests for the king mainly for purposes of hunting, and (b) reserved forests for the state which were open to the general public (Upadhyaya, 1991, p. 116)."

According to the Chinese traveller Huien Tsang (602 – 664 AD), after the Gupta period (7th century AD), India's territory was divided into several states, which were ruled by a number of kings (Upadhyaya, 1991). They used to fight with each other for the expansion of their kingdom. Beside this, several foreign invasions also happened during this period. This situation continued until the 14th century. There was no policy for the protection and improvement of forest and forest products. This situation affected Indian forest and forest livelihoods adversely.

During the Mahomedan period, the continuous intrusion of nomadic tribes destroyed a large portion of forest land in the Indian sub-continent. According to Ribbentrop:

> "No religious scruples prevented the Mussalman from destroying forest which [was]…declared to be a free gift of nature, the property of everyone, in the same way as water." (Ribbentrop, 1900, p. 33-34)

The nomadic tribal people used to convert forest land into pasture land for crop cultivation or cattle farming. The continuous destruction of forest areas for about 750 years under the Mahomedan rulers also hampered the livelihoods of original forest communities, who had been living for some thousands of years in Indian forest areas. During the Mughal period, a few forests had also been declared as restricted areas to ensure a good hunting environment for Mughal emperors (Ribbentrop, 1900).

Until the British colonial period in India, a large number of people (mostly indigenous tribal communities) used to live in or around forest areas depending entirely on forest products (Fried, 1975). These people believed themselves to be the actual owners of forest with rights to use forest products for their subsistence purposes (Ghate, 1992). They used to worship the forest as their God. Ritual, cultural as well as social celebrations were strongly interrelated with the forest environment.

For these people, the entire forest area was their home. They used to move from one area to another to collect food, fodder, firewood, wild game and many other products for their subsistence purposes. They used to sell or barter very little to outsiders to get non-forest products. Before the East India Company's rule (1757 – 1857), there was no restriction on forest and forest products collection for forest people in India apart from forests reserved for hunting for rulers (Chowdhuri *et al.*, 1992; Schlich, 1906; Ribbentrop, 1900).

> "In pre-British India the cultivated land was producing a great variety of crop [sic], and the non-cultivated [especially, forest] land a variety of plant and animal produce largely

> for fulfilling the subsistence needs of the local populations. This ...[during colonial period] had to be changed with cultivated lands focusing on the production of a few crops, like cotton, jute, indigo and tea and the non-cultivated lands a few choice timber species like teak (*Tectona grandis*), primarily for export to Britain." (Gadgil, 1991, p. 27)

5.3 NTFP policy and forest livelihoods in the colonial Bengal

During the colonial period (1757 – 1947), Indian forests were used as an important source of revenue. The British East India Company's main target was to strengthen their rule over India (which they won at the Battle of Plassey in June, 1757) and to increase their revenue from forest products. They had no policy or plan to protect Indian forest and forest products. In his book '*Forestry in British India*', Ribbentrop said:

> "Our earlier administrators (British East India Company), occupied with the building up of an Empire, probably never thought of the important part forests have always played, play now, and will forever play in the household of nature …. The people took all that they required for their simple wants where they found it. Trade in forest produce and wood-consuming industries were in their infancy … no apprehension was felt that the supply of forest produce would ever fall short of the demand, and forests were considered as an obstruction to agriculture … and consequently a bar to the prosperity of the empire." (Ribbentrop, 1900, p. 59.)

To control the collection of forest products by native forest dwellers, a number of rules and regulations were implemented by the British.

Due to the need for timber for constructing railway tracks, developing ship-building industries (especially for the Royal Navy), making furniture, providing a continuous supply of fire-wood and for the exportation of timber to Britain, heavy pressure was placed on Indian timber forests during this period (Schlich, 1906; Guha, 1989).

> "Early years of British rule [*during the period of the East India Company rule*] were characterized by the most thoughtless exploitation of teak wherever it occurred. Thus Munro, writing in 1838, states: "The system of throwing open teak forests to all who wish to cut, or giving them to constructors, is in the highest degree ruinous. They cut indiscriminately all that comes in their way; any range of forests, however extensive, would be destroyed if left to their tender mercies. They never think of planting all that such speculators calculate on is present profit or loss, without troubling their heads about depriving future generations of the benefit they now enjoy"." (Gadgil, 1991, p. 29)

After the transfer of power from the East India Company to the British Government (1857), however, the British Government realised that timber supplies needed to be conserved and tried to protect forest areas, converting them into government property. To achieve the monopoly power over Indian forest resources (mainly timber), the British Government had to control local inhabitants' rights by implementing strict rules and regulations. These policies caused fury among forest communities (Joshi, 1983).

For this reason, all over India the same policy was used to protect commercially valuable forests from illegal felling and the collection of forest products, ignoring the forest-based livelihoods of the native people. The British Government controlled most of India (including Pakistan and Bangladesh) centrally. There were some areas under *Rajas* or *Nawabs* (local kings), but in most cases they had no plans or policies regarding the management and protection of forest or forest products.

British forest policies were enacted for the purpose of conserving future supplies of timber, forest products and wild animals and to increase revenue from such items, while the thoughts and livelihoods of local forest dwellers were largely ignored (Weil, 2006). To control the collection of Teak timber for the Royal Navy from the Malabar hills of India (Western Ghats), a committee was set up in 1805. This was the first committee regarding the control of timber collection from any Indian forest area (Schlich, 1906). However, the target of this committee was to ensure a future supply of Teak for the Royal Navy rather than to conserve the forest as a whole.

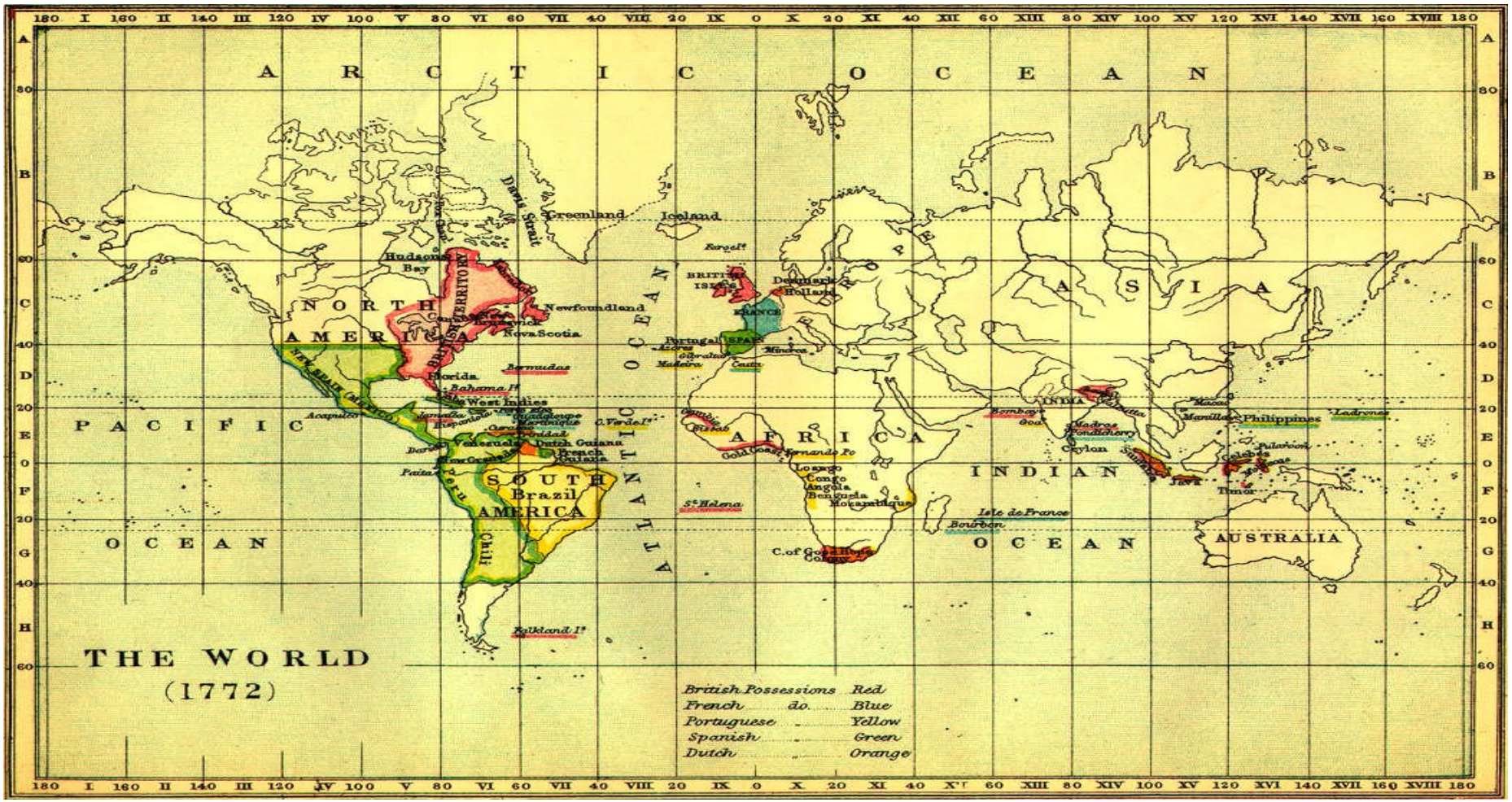


Fig. 5.1: Map shows the British colonies around the world at the last half of 18th century

Source: The World in 1772, courtesy, Center for Study of the Life and Work of William Carey, D.D. (1761-1834), William Carey University, Hattiesburg, Mississippi, USA. Available at: http://homepages.rootsweb.ancestry.com/~poyntz/India/wrld1772.html (Accessed 15th January 2008)

Following the proposal of this committee, Captain Watson was recruited as the first Conservator of Forest in India in 1806. Until 1823, the post of Forest Conservator worked to strengthen Britain's unjustified monopoly over Indian Teak forest. In 1831, the post started working according to the recommendation of Indian Navy Board and, in 1847, a small Forest Department was set up by the then Conservator of Forest, Dr. McClelland. In the mid-nineteenth century, British India was one of the first countries in the world with a national forest service. It had this even earlier than the United States (Poffenberger *et al.*, 1996).

In 1854, Dr. McClelland submitted a report regarding the rapid destruction of Indian timber forest by private companies and local people. On the 3rd August 1855, Lord Dalhousie issued a guideline (forest policy) for the conservation of forest products. From this time, 'scientific forestry' started in India. Local people and other non-permit holders lost their rights to enter the forest areas to collect timber or NTFPs. The guideline was again modified in 1894 (Chowdhuri *et al.*, 1992).

The demarcation and nationalisation of Indian forest started from the 1850s. Subsequently, open forest areas started to be converted into reserved forest areas, where without [colonial] government permission nobody could enter for the collection of timber and non-timber forest products. The total forest area and type (reserved or open) varied from year to year during the entire British colonial period (1757 – 1947). The following maps (Fig. 5.2, 5.3, 5.4 and 5.5) of different years shows the differences of the total area under the Presidency of Bengal and can also give a rough idea of the forest areas within the Presidency of Bengal.

In 1856, Dr. Cleghorn, the Conservator of the Forest of Madras and Dr. Gibson, the Conservator of the Forest of Bombay submitted a report giving special emphasis to the importance of forests from an ecological point of view. After 1860, the British Government implemented a more commercialised forest management policy in South Asian countries to increase revenue from forests (Weil, 2006). However, it failed because of the geo-physical and socio-cultural variations from one place to another. In 1864, Mr Dietrich Brandis was given the post of the first Inspector General of Forest to the Government of India. Later he argued that to preserve the Indian forest, the involvement of native people was essential. In 1864, the Forest Department of Bengal was set up and a Conservator of Forest was also recruited. The first Indian Forest Act was issued in 1865. Later this Act was modified in 1873-74 and again in 1878. In 1924, a new Indian forest Act was implemented replacing the previous one (Ribbentrop, 1900).

Fig. 5.2 Map of India – 1822 (showing different territories of colonial India)

Source: India, 1822, courtesy, Center for Study of the Life and Work of William Carey, D.D. (1761-1834), William Carey University, Hattiesburg, Mississippi, USA.
Available at: http://www.wmcarey.edu/carey/maps/ (Accessed 12th January 2008)

Following the Voelcker Resolution[10] (1894), Indian forests were divided, for the first time, into several categories according to their importance. These were reserved forests (which was

[10] "In Chapter VIII of his report on the improvement of Indian Agriculture, Dr Voelcker dwells at length upon the importance of so directing the policy of the Forest Department that it shall serve agricultural

entirely under government control), protected forests (where forest dwellers could enter to collect food and fodder but if needed government could stop it), and unclassed state forests (where the government used to give permission to forest communities to collect forest products for their household needs) (Gadgil and Guha, 1992). In the Indian Forest Act of 1927, however, the criteria had been decided, to be followed, for the categories (reserved, protected or unclassed state forests) of Indian forests (Department of Forest & Environment, 1927; available at: http://envfor.nic.in/legis/forest/forest4.html, cited on 26th May 2008).

interests more directly than at present, and in his Review of Forest Administration for 1892-93 the Inspector General of Forests discusses in some detail the principles which should underlie the management of State forests in British India, ... The sole object with which State forests are administered is the public benefit. In some cases the public to be benefited are the whole body of taxpayers... but in almost all cases the constitution and preservation of a forest involve, in greater or less degree, the regulation of rights and the restriction of privileges of user in the forest area which may have previously been enjoyed by the inhabitants of its immediate neighbourhood. This regulation and restriction are justified only when the advantage to be gained by the public is great..."
(Source: http://www.nlsenlaw.org/forest/law-policy/old-forest-policy-october-1894/; cited on 24th July 2008)

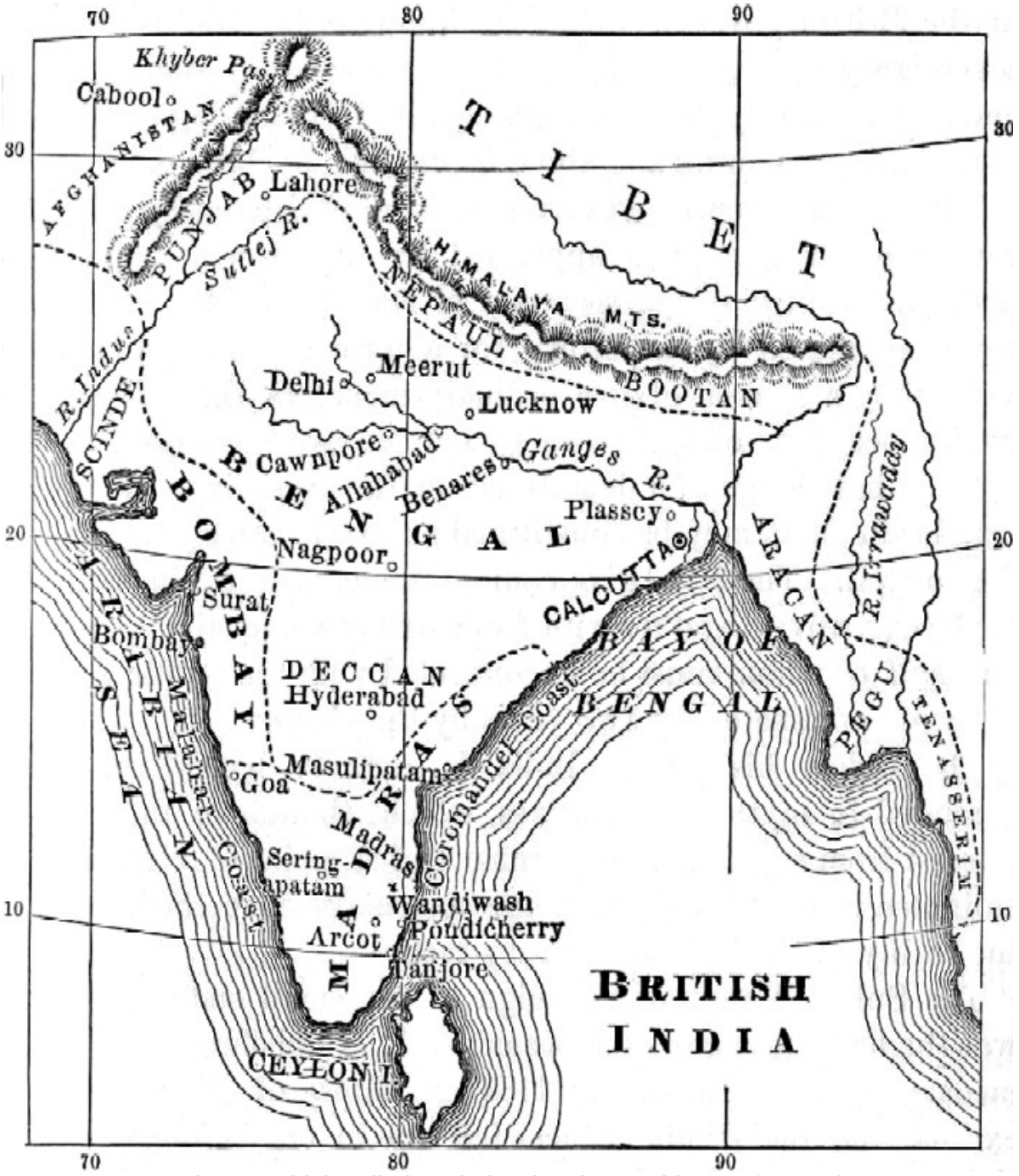


Fig. 5.3 British India (1889) showing the Presidency of Bengal

Source: British India, 1889**,** courtesy, Center for Study of the Life and Work of William Carey, D.D. (1761-1834), William Carey University, Hattiesburg, Mississippi, USA.
Available at: http://www.wmcarey.edu/carey/maps/1889india.jpg (Accessed 12th January 2008)

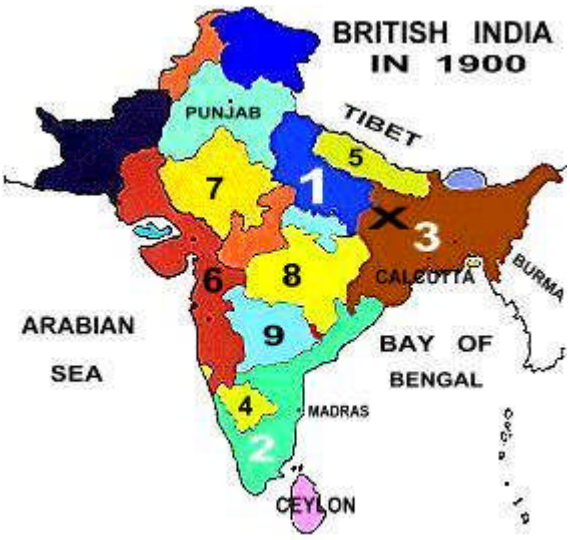
During the colonial period, the same policy was implemented in all over British India, including Pakistan and Bangladesh. Sivaramakrishanan (1999), however, has described how the uniform forest policy of the British failed to work properly because of the regional socio-physical variations. To him, the effective protection of forest and forest products required

local peoples' knowledge and historic experiences to be utilised and given priority over imported forest management techniques.

According to Karlsson (2001), British 'scientific forest' policy forced some tribal communities (e.g., the Rabha – a tribal community of the Duars area) of Sub-Himalayan Bengal (currently known as West Bengal) to change their aboriginal lifestyle and to stop their practices of shifting cultivation. To protect forests and for the collection of forest products (mainly timber), some tribal people had been used as permanent forest labourers. To accommodate these labourers, a number of 'forest villages' were set up within reserved forests (Forest Act, 1865 and the Forest Policy, 1894).

Fig. 5.4 BRITISH INDIA

(PRESIDENCIES, AGENCIES , PROVINCES, STATES - circa. 1900)



1 - UNITED PROVINCES

2 - MADRAS PRESIDENCY

3- BENGAL PRESIDENCY (X - SHOWS BEHAR WITHIN THE PRESIDENCY)

4- MYSORE

5- NEPAL

6- BOMBAY PRESIDENCY

7- RAJPUTANA AGENCY

8- CENTRAL PROVINCES

9- HYDERABAD

Source:http://scnc.ukzn.ac.za/doc/SHIP/MAP.html (Accessed 14th May 2008)

According to Chowdhuri *et al.* (1992), other people living in or around these forest villages, but with no legal right to occupy them (or not included in *Khatiyan* part 2), were known as *faltus* and relied heavily on bonafide forest villagers for their subsistence (Jewitt, 1995). With the implementation of the 1865 Forest Act, these *faltu* people lost their rights to enter or collect forest products from reserved forests, but the situation was the same as it was before in the case of protected and unclassed state forests. The fieldwork for this research was conducted in protected and unclassed state forests of Purulia, Bankura and West Midnapur, where forest dwellers had been living in the forest vicinity for centuries and were dependent upon forest products.

The forceful implementation of scientific forest policy stimulated indigenous forest dwellers to collect forest products (particularly foods, fodder and firewood) illegally, ignoring the British Forest Department's rules and regulations. By doing this, they tried to demonstrate their age-old rights to use Indian forests. Sometimes they became violent and set fire to the reserved forests (e.g., 1916 – Uttarakhand forest-fire, Guha, 1989).

British forest policy mainly emphasised the conservation and collection of timber products. Most other forest products (minor or NTFPs) received comparatively less priority, although the collection of bamboo and grass received special attention. Other important NTFPs normally collected for commercial purposes were caoutchouc, cardamoms, cutch, lac, myrabolans and resin. Together, these NTFPs represented an important resource bringing an average annual revenue of 11,806,302 pounds (Table 5.1). Only villagers authorised to do so by the Forest Department could collect forest products from reserved forests. Other local people used to collect forest products for their subsistence or commercial purposes from protected or unclassed state forests.

Table 5.1: Average Annual Imports of Minor Forest Products in the United Kingdom from India

Name of the Minor Forest Products	*Value*
Caoutchouc	£6,027,050
Gutta-percha	1,180,296
Dye-stuffs	518,014
Dye-wood	249,412
Myrabolans	170,876
Gums of various kinds	1,305,683
Oil of turpentine	834,574
Resin	528,728
Galls	76,807
Pitch	42,966
Tar	92,706
Vegetable fibres	779,190
Total Value -	11,806,302

Source: Schlich, 1906

These minor products (NTFPs) also had a very important role in forest communities' livelihoods. Thus, in some areas, forest communities started to set fire to the timber forests specially rather than the mixed forest, from where they used to collect NTFPs including fire-wood and fodder for their household purposes (Guha, 1989). It was a protest against the Forest Department's decision to control forest products collection by forest fringe dwellers from reserved forests.

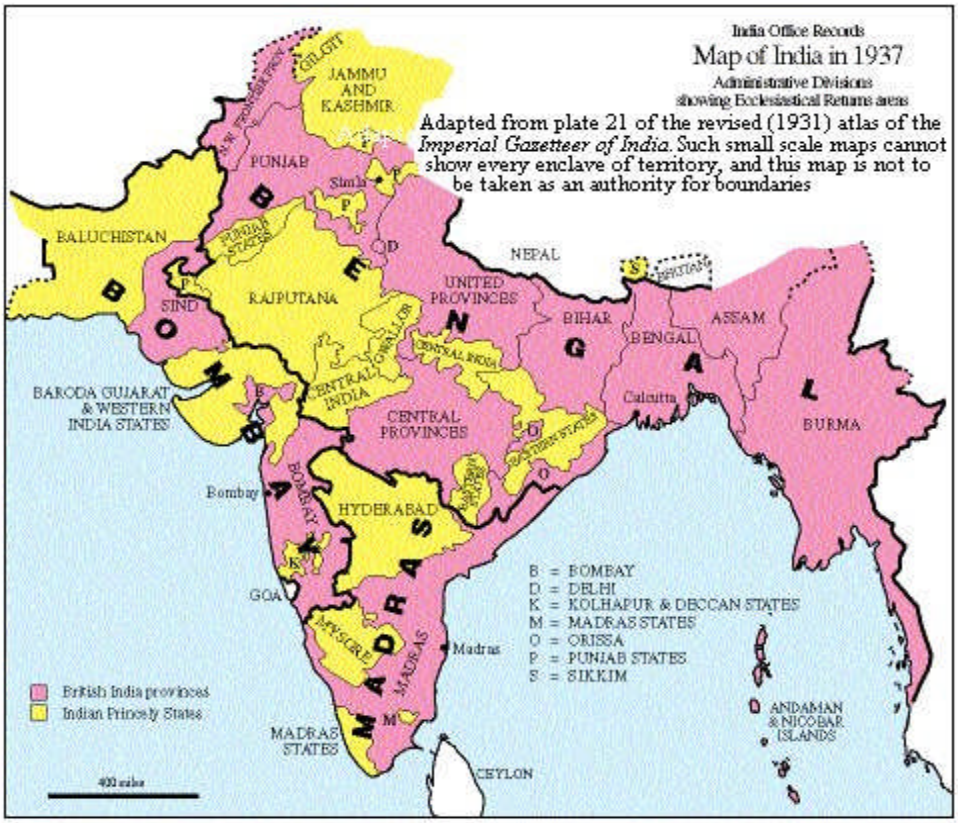


Fig. 5.5 Map of colonial India showing the Presidency of Bengal (1937)

Source: http://www.bl.uk/collections/oiocfamilyhistory/familyindiamap.html (Cited on 15th May 2008)

Though most of the British colonial officers put the need for commercial timber above the subsistence requirements of local people, a few were sensitive to the impact of forest policy on local livelihoods. Verrier Elwin, Stebbing, Dietrich Brandis and Voelcker were among them (Jewitt, 1995). They gave special emphasis to the importance of forest livelihoods and argued for forest policy needed to be more sensitive to the requirements of forest dwellers. As the number of forest officers were insufficient to tackle all the forest related problems, it was necessary to involve local people regarding the conservation of forest and forest products (Guha, 1989). Elwin, for example, argued for the establishment of village forest councils (*Van Panchayat*s) during negotiations over the Indian Forest Act 1924 (Gadgil and Iyer, 1989; Jewitt, 2002).

The following graphs (5.1, 5.2, 5.3 and 5.4) illustrate the forest features of the Presidency of Bengal and the importance of NTFPs during the British colonial period. The total forest area (Graph 5.1) of the Presidency of Bengal varied from year to year, because of the changes in the total area of the Presidency. In 1868-69, the total officially recorded forest area in the Presidency of Bengal was just 220 miles², which increased to 12,073 miles² in 1939-40. The total reserved forest was increased considerably within this period. In 1874-75, it was only 1,467 miles² whereas in 1939-40 the total reserved forests was 6,338 miles². However, the protected forests and unclassed state forests decreased from 3,675 miles² and 4,033 miles² in 1899-1,900 to 847 miles² and 3,399 miles² in 1939-40 respectively. With the increase of reserved forests the revenue from forest products were also increased during the colonial period. It was because with the upgrade of forest cover, the quantity of forest products was also improved.

The total revenue (Graph 5.2) collected from forest products including timber was Rs.[11] 171,184.00 in 1868-69. The expenditure during the same period was Rs. 126,256.00, producing a surplus of Rs. 44,928.00. In 1910-11, the total forest area decreased because of the exclusion of some districts from the Presidency of Bengal. Therefore, the revenue, expenditure as well as surplus also decreased to some extent. However, with the conversion of protected and unclassed state forests into reserved forests, their management improved and became more systematic. Simultaneously, the revenue, expenditure and surplus from forest products again increased in the following years. In 1939-40, the total revenue collected from forest products was Rs. 2,398,085.00 whereas the surplus was Rs. 658,033.00.

During the colonial period, NTFPs were collected for commercial and local purposes. In 1879-80, the total outturn from NTFPs was Rs. 62,703.00 (Graph 5.3). The greatest amount of NTFPs normally used to be collected from reserved forests. Until 1910-11, the outturn from NTFPs was quite similar from reserved forests and protected forests. However, after 1911-12 with the changes of total forest area and conversion of protected forests to reserved forests,

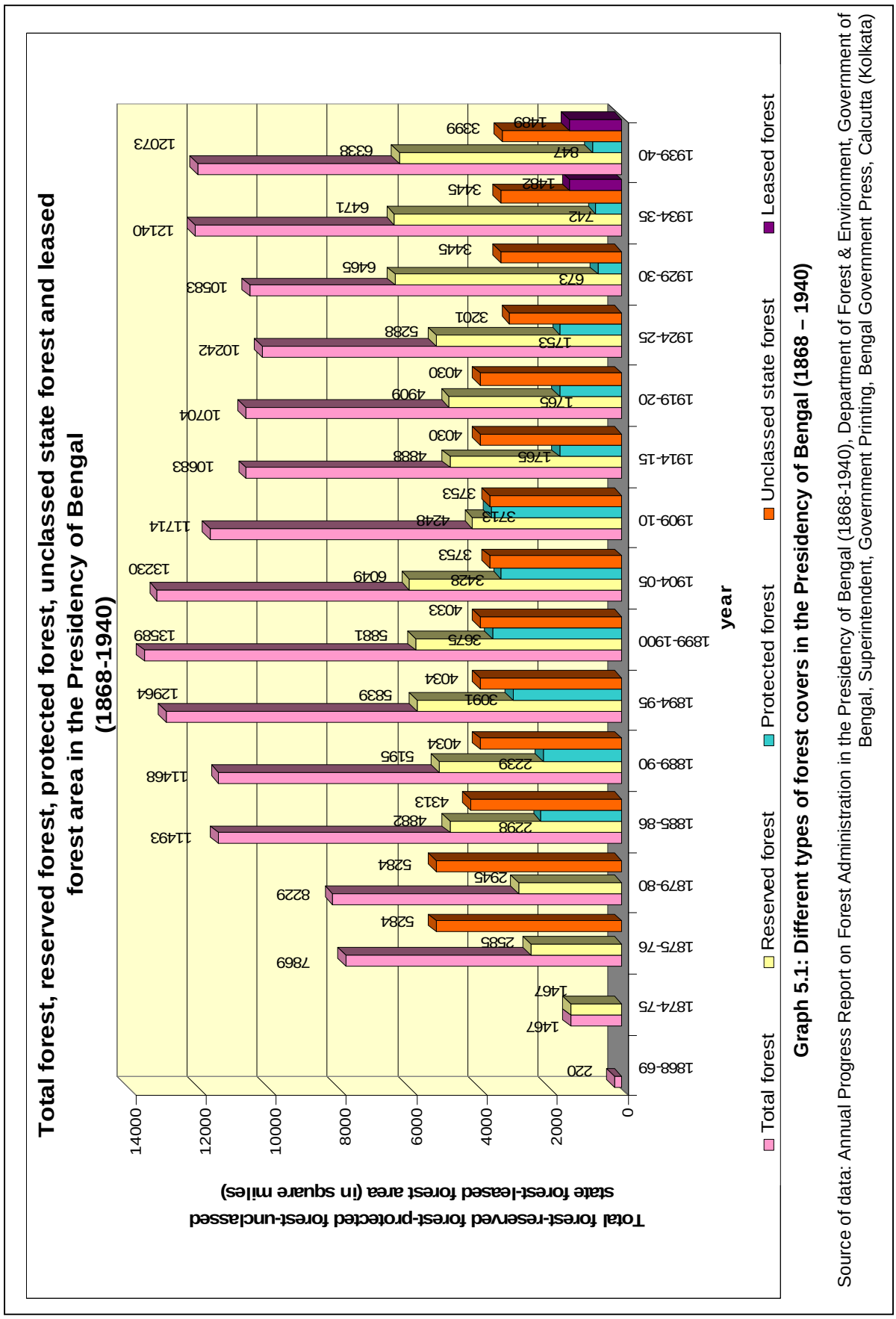
[11] Rs. - Indian Rupees.

Exchange rates between the Indian Rupee (INR) and the British Pound (GBP)

Period	Price of silver (in pence per Troy ounce)	Rupee exchange rate (in pence)
1871-72	60½	23 ⅛
1875-76	56¾	21⅝
1879-80	51¼	20
1883-84	50½	19½
1887-88	44⅝	18⅞
1890-91	47 11/16	18⅛
1891-92	45	16¾
1892-93	39	15
		Source: Dadachanji, 1934, p. 15.

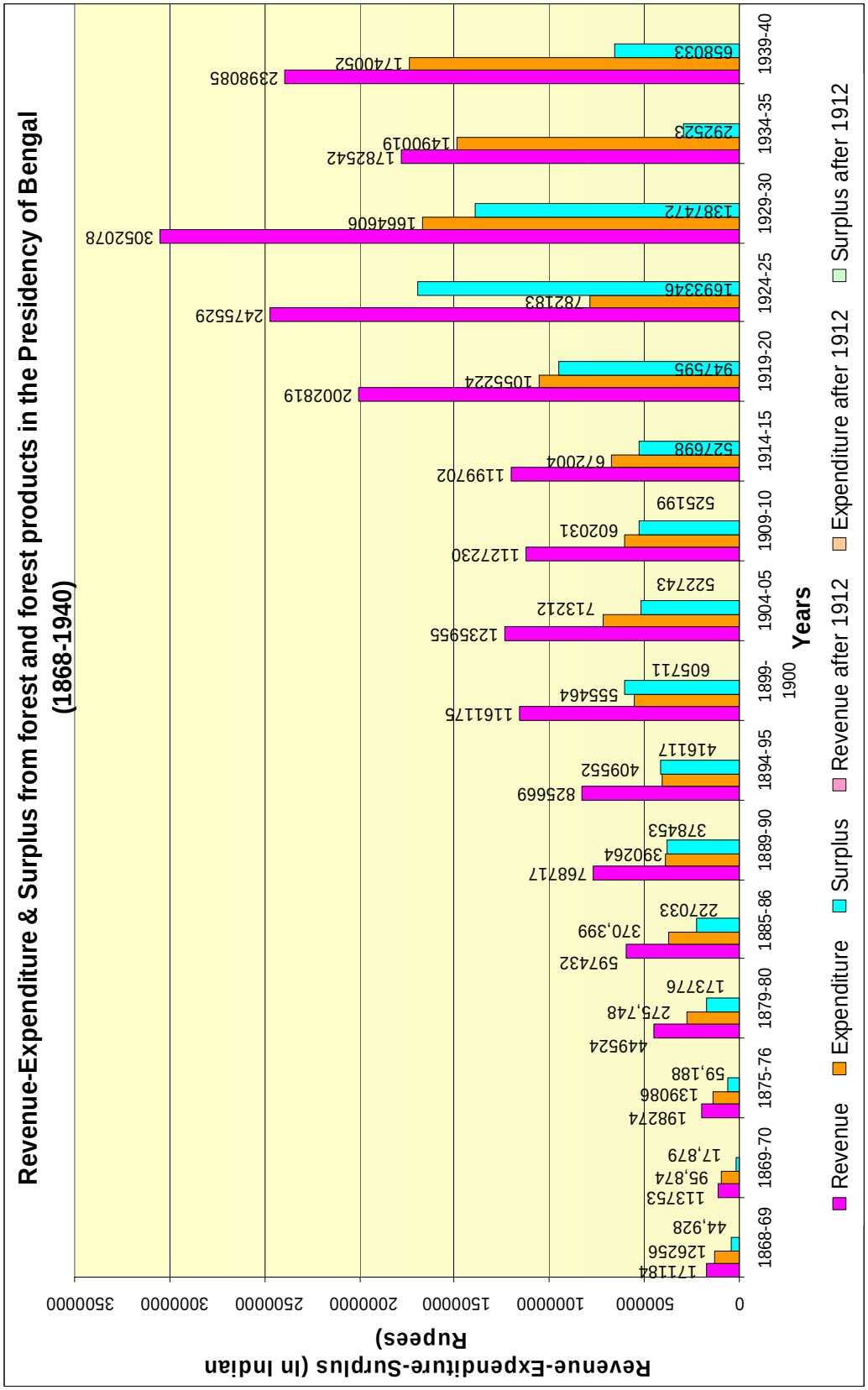
the outturn from NTFPs increased in the reserved forests. In 1939-40, the total outturn from NTFPs was Rs. 485,685.00 among which 84.14% (Rs. 408,659.00) was collected from reserved forests.

The total number of forest offences (such as illegal timber felling, hunting wild-aimals, harvesting of NTFPs from reserved forests without Forest Department permission) increased throughout the colonial period (Graph 5.4). It was because of the conversion of open forests into reserved forests and the implementations of strict rules and regulations on the collection of forest products by forest dwellers (Jewitt, 2002). Many local forest dwellers, who were ejected from reserved forests, used to continue to collect forest products ignoring forest regulations. In 1875-76, a total of 30 legal cases were taken out against local people for 'forest offences' and 70 people were arrested. In 1939-40, by comparison, the total number of cases was 8,261 and 13,621 people were arrested. Among them, 4,866 people were arrested for the collection of NTFPs including fire-wood (Government of the Presidency of Bengal, 1869; 1875; 1880; 1885; 1890; 1895; 1900; 1905; 1910; 1915; 1920; 1925; 1930; 1935 and 1940).



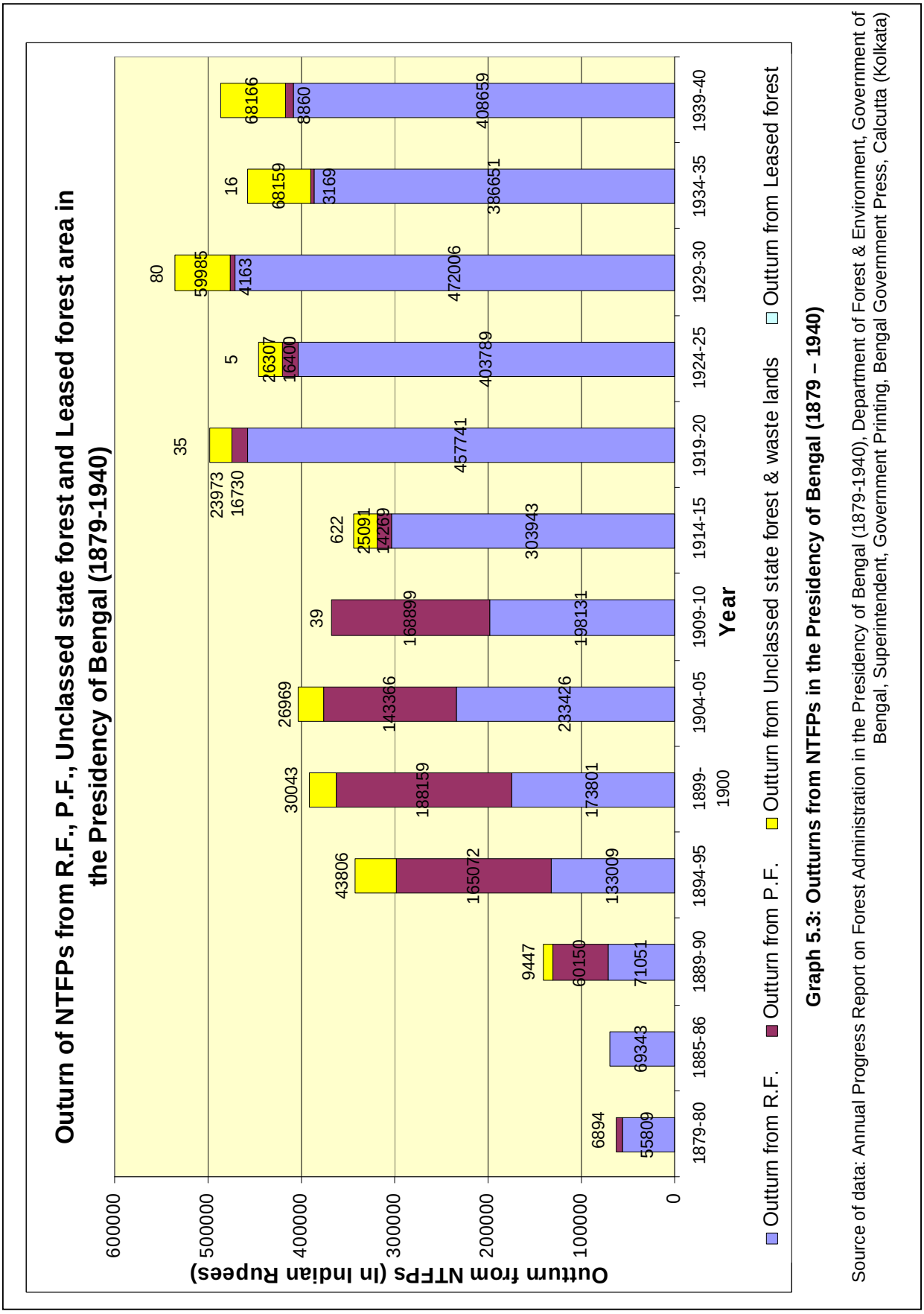
Graph 5.1: Different types of forest covers in the Presidency of Bengal (1868 – 1940)

Source of data: Annual Progress Report on Forest Administration in the Presidency of Bengal (1868-1940), Department of Forest & Environment, Government of Bengal, Superintendent, Government Printing, Bengal Government Press, Calcutta (Kolkata)



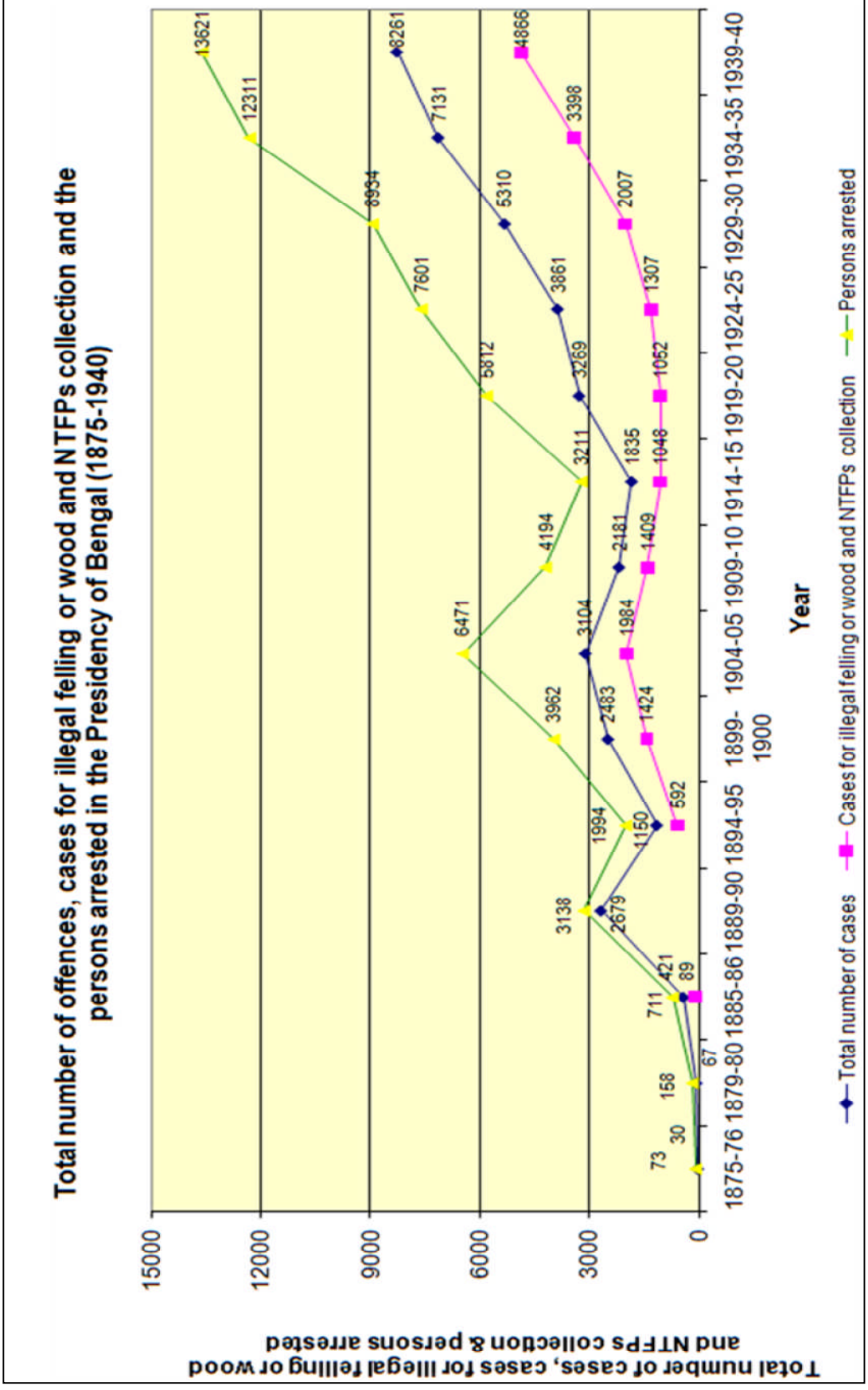
Graph 5.2: Revenue – expenditure and surplus from forest products in the Presidency of Bengal (1868 – 1940)

Source of data: Annual Progress Report on Forest Administration in the Presidency of Bengal (1868-1940), Department of Forest & Environment, Government of Bengal, Superintendent, Government Printing, Bengal Government Press, Calcutta (Kolkata)



Graph 5.3: Outturns from NTFPs in the Presidency of Bengal (1879 – 1940)

Source of data: Annual Progress Report on Forest Administration in the Presidency of Bengal (1879-1940), Department of Forest & Environment, Government of Bengal, Superintendent, Government Printing, Bengal Government Press, Calcutta (Kolkata)



Graph 5.4: Forest offences in the Presidency of Bengal (1875 - 1940)

Source of data: Annual Progress Report on Forest Administration in the Presidency of Bengal (1875-1940), Department of Forest & Environment, Government of Bengal, Superintendent, Government Printing, Bengal Government Press, Calcutta (Kolkata)

5.4 Post-colonial NTFP policies and forest livelihoods of West Bengal

After independence (1947), states and state forest territories developed in India. The Government of India prepared its own scientific forest policy (Forest Act, 1952) to protect forests and forest products as the demand for timber increased considerably. Indian policy makers were more concerned with the 'national interest' than with native forest communities (Guha, 1989). Forest communities were in much the same situation as they were during the colonial period. The collection of NTFPs including food, firewood and fodder became more difficult for them. As a result, some forest communities considered the British colonial rulers to be comparatively better than the newly formatted state governments. During the colonial period, there was less corruption within the Forest Department and the activities of agents or middlemen were under the control of the British Government (Karlsson, 2001). The new Indian Government compelled forest fringe dwellers, who are not right holders (or those people who are not listed in *Khatiyan* part 2), to purchase NTFPs that they previously had the right to collect for bonafide subsistence purposes (Jewitt, 2002).

Though the government-allocated price was nominal, administrative and political corruption meant that only a very small amount of NTFPs could be obtained at this nominal price (Pathak, 1994; Jewitt, 2002a). As a result, many communities were compelled to change their livelihoods, which were entirely dependent on forest products. It also affected their socio-cultural systems. The system also stimulated some forest communities to collect forest products (NTFPs, fodder and foods) illegally as population increases created resource shortages.

This situation created an excellent opportunity for many outsiders to cut timber and hunt wild animals with the direct or indirect support of forest communities. Sometimes forest communities used to help such outsiders in exchange for some money or other benefits (Pathak, 1994). To control this exploitation of forests, the Government of India set up the Dhebar Commission (1960) to review forest policy. The commission's report made it clear that without the active participation of local forest people, the forest department would not be able to protect forests and forest products (Misra and Dash, 2000).

In the late 1970s and early 1980s, many 'forest movements' occurred all over India in protest against restrictions on forest use. The Chipko movement was one such example (Mawdsley, 1998). Nationalisation of some NTFPs (from 1960s onwards, especially in 1976) was also opposed by forest people in several parts of the country (Pattanaik and Human, 2000).

For the conservation of forests for ecological purposes, the Department of Environment was set up in 1980 under the Ministry of Science and Technology. With the implementation of the Forest Conservation Act 1980, it became compulsory for state governments to ask for permission before any timber felling (Jewitt, 2002). The Draft Forest Bill of 1981 was a remarkable step for Indian forestry from the point of conservation as well as protection aspects. This bill, which was later overthrown, proposed that state forests should come entirely under central government control and the power of forest officers should be increased to control illegal felling (Pathak, 1994).

During the Sixth Five Year Plan period (1979-1984), a significant amount of money had been spent on the conservation and development of forest areas to sustain the ecological balance. Up to 1985, the Forest Department was under the control of Ministry of Agriculture, but with the expansion of the forest department and its activities, the Ministry of Environment and Forest, an independent department, was developed. Many Forest Department officers, however, started realising that the implementation of strict forest policies coupled with an increasing budget were not enough to protect forests and forest products and that only the vigorous involvement of local forest people could promote the successful conservation of forest resources.

Through the implementation of the National Forest Policy 1988, the Central Government gave special importance to local people regarding the conservation of forest ecosystem. With the return of the authority for forest management to the local *Panchayat* (local governing body) and the direct involvement of the forest dwellers to preserve forest areas, a new era of Indian forestry started (Palit, 1993). Following the success of Arabari (in West Midnapur district of West Bengal) forest management, the Ministry of Environment and Forest, Government of India inspired a lot to work together with forest dwellers for the management of native forests in all over India. State governments also got more power over their state-forest areas from this time. State Forest Departments could take decisions for the conservation of forest resources and forest culture.

The involvement of tribal people in the collection of minor forest products including food, fodder and fuel-wood with the cooperation of forest officers encouraged some forest communities to protect their local forests (Guha, 1989). By the end of the 1980s, the central Government of India spent around $400 million through different state governments on the development of forest land (which covers about 23% of its total geographical area) and the forest villages (Poffenberger *et al.*, 1996).

Table 5.2: Forest features of West Bengal (1947 – 2000)

Year	Reserved forest (²miles)	Protected forest (²miles)	Leased forest (²miles)	Other forests (²miles)	Total forest (²miles)	Revenue (Rs)	Expenditure (Rs)	Surplus (Rs)	Outturn from NTFPs (Rs)	Cases filed	People arrested for breaching forest rules
1946-47	2648	1	1207	-	3856	3461003	3367306	93697	119781	2323	4265
1949-50	2674	1	1207	13	3895	6108495	5377453	731042	347554	2848	4359
1959-60	-	-	-	-	-	-	-	-	-	-	-
1969-70	6994.17 (²Km)	4235.35 (²Km)	460.05 (²Km)	107.65 (²Km)	11797.22 (²Km)	24470377	17492190	6978187	1279955	3341	474
1979-80	-	-	-	-	-	90172000	-	-	3417000	2927	-
1989-90	-	-	-	-	-	434564000	467057000	-	7404000	-	-
1999-2000	7054	3772		1053	11879	238191000	1352680000	-	-	30	-

Source: Annual Forest Reports – 1947-2000, Department of Forest, Government of West Bengal, Kolkata

5.5 Contemporary NTFP policy in India and West Bengal

From the early 1990s, Forest Departments of different states started a range of programmes to increase awareness of forests and forest products and in each programme the participation of local people was emphasised as part of a broader initiative to promote greater cooperation between local people and the Forest Department with regard to forest use and management (Saxena, 2003). Forest officers made it clear to forest dwellers that for a continuous supply of forest products, they have to undertake sound initiatives for afforestation. To include government waste or barren lands within the official forest area, a massive afforestation programme was started following the Draft Forest Bill, 1994.

Presently, in the National Afforestation Programme (NAP)[12] forest dwellers are paid by the Forest Department to plant trees and preserve forest areas (Regional Centre, National Afforestation and Eco-Development Board, 2005). Steps have been taken to transform barren or unused non-cultivated land into forest areas through massive plantation programmes using traditional as well as modern techniques involving local forest people. In many cases, forest villagers can collect NTFPs from these areas free of charge and when the trees mature, they are paid to assist with felling operations and may be allowed to keep a proportion of the profits (usually 25%) from the timber sold. To protect the forest, Forest

[12] "The scheme titled National Afforestation Programme (NAP) has been formulated by merger of four 9th Plan centrally sponsored afforestation schemes of the Ministry of Environment & Forests, namely, Integrated Afforestation and Eco-Development Projects Scheme (IAEPS), Area Oriented Fuel wood and Fodder Projects Scheme (AOFFPS), Conservation and Development of Non-Timber Forest Produce including Medicinal Plants Scheme (NTFP) and Association of Scheduled Tribes and Rural Poor in Regeneration of Degraded Forests (ASTRP), with a view to reducing multiplicity of schemes with *[the]* similar objectives, ensuring uniformity in funding pattern*[s]* and implementation mechanism*[s]*, avoiding delays in *[the]* availability of funds to the field level and institutionalising peoples participation in project formulation and its implementation. The Scheme will be operated by the National Afforestation and Eco-Development Board, Ministry of Environment and Forests as a 100% Central Sector / Centrally Sponsored Scheme."
(Source: http://www.envfor.nic.in/naeb/nap/NAEBwebst.html; cited on 12th August 2009)

Protection Committees (FPC) have been formed by the Forest Departments of different state governments and are often closely linked with local *Panchayats*. This communal forest policy inspired many forest dwellers to protect the old as well as newly created forest areas for their own subsistence purposes (Pathak, 1994).

5.5.1 Joint Forest Management (JFM) programme and the role of NTFPs in India and West Bengal

Joint Forest Management (JFM) is a decentralised method through which native people get an opportunity to protect local forests from further degradation. The guidelines for JFM were set out in the 1988 Forest Policy (Prasad, 1999; Kumar, 2002). Observing the success of community-based forest management in West Bengal's Arabari Forest Range (in 1974), the Central Government of India gave rights to individual state governments to establish their own JFM schemes that would involve local forest communities in managing and protecting local degraded forest areas. The main idea behind the JFM was the 'care and share' principal in which local people would be more likely to protect forests if they get a share (the exact amount of which was to be determined by individual states) of the final timber harvest (Prasad, 1999). Employment opportunities have also been developed to encourage forest-based communities to cooperate with the Forest Department. The success of the Arabari experiment (see below) even helped to secure international funding from the World Bank and the Ford Foundation to enhance the programme in other parts of the country.

In 1971, the first experimental community-based forest management was started at Arabari Sal Forest Division in the district of West Midnapur in West Bengal under the guidance of Dr. A.K. Banerjee, a silviculturalist and the then Divisional Forest Officer of Arabari Forest Division (World Bank Website, 2007). The success of community-based forest management inspired forest policy-makers to pursue the JFM policy. JFM involves cooperative work between forest protection committees, formed with local forest dwellers, and the state or central government forest departments (Jewitt, 1995). For plantations in newly created forest areas and the collection of forest products, JFM members are often paid to plant trees and undertake other forestry-related operations. JFM members also get a certain amount (24% in West Bengal) of the profit from the selling price of forest products (Sinha and Bawa, 2002).

As many forest-dependent communities struggle to achieve their subsistence needs, the JFM scheme proved popular as it helped them to meet their requirements for forest products such as firewood, fodder and some other NTFPs and encourage a longer term view with regard to forest protection. According to environmentalists and NGOs (such as the Regional Centre for Development Cooperation – RCDC, Orissa), community based forest management can be

considered a social movement in eastern India. Through this system, tribal communities regained their own age-old social and cultural lifestyles based on local forest environments (Poffenberger *et al.*, 1996). The success of JFM in India has attracted the attention of other country governments, environmentalists as well as NGOs.

Initially, the power and socio-economic differences between the local forest dwellers and the Forest Department officers created some problems in the JFM system (Bahuguna, 2000), but through prolonged discussions, these problems had been solved. By January 2000, around 10.24 million hectares of forest out of 76.5 million hectares of India's total forest came under the JFM system and about 36,075 forest protection communities were working all over India (Government of India 2000, in Jewitt, 2002).

5.6 Role of West Bengal Forest Development Corporation Limited (WBFDC) in forest resource management

A long time after independence, the first Forest Development Corporation of India was set up in West Bengal in 1974 for the conservation of forest, wildlife and forest environment as well as for the systematic operation of forest products (including timber and non-timber) within the Himalayan mountain area of North Bengal. The Government of West Bengal took a pioneering position in this regard in India. The successful restoration of Arabari Forest Range [Midnapur, West Bengal], through participatory forest management, inspired the Government of India to set up Forest Development Corporations (FDCs) in different states. Following the order of the Supreme Court of India, the West Bengal Forest Development Corporation Ltd (WBFDC) organisation placed special emphasis on the protection of the Himalayan forest ecosystem. The main aim of this corporation was to involve local forest dwellers in the preservation of forest resources:

> "The FDCs were established with a view to professionally organize the collection and marketing of non-timber forest products and eliminate the middlemen so that maximum benefits from the market are passed on to tribal collectors. These organizations were tasked to manage non-timber resources on a sustainable basis." (Tewari, 2006, p. 280)

The WBFDC was set up mainly to protect the Himalayan forest ecosystem of the northern part of the State (WBFDC, 2004). The initial success of the corporation helped to expand its working area gradually. Presently, two different projects are being conducted by this corporation – one in North Bengal (in the districts of Jalpaiguri and Cooch Behar) and the other one in South Bengal (in the districts of Bankura, Purulia, and East and West Midnapur). The

purposes of these projects are continuous plantation developments, the collection of mature trees for timber, the control of illegal forest product smuggling and infrastructural development for the protection of forest areas. This work is carried out mainly by local people with guidance from corporation officers. Within the last three years, this corporation has spent about $ 0.4 million dollars through FPCs. This corporation is also helping forest people to develop self-employment through dairy farming, poultry farming, piggeries etc. (WBFDC, 2005; WBFDC, 2006).

The main NTFPs collected by this corporation are honey and citronella grass. Apart from these two products, a small amount of turmeric, katha, cashew nut seeds and lac are also collected by local people through the Joint Forest Management (JFM) system. The WBFDC, however, collects these NTFPs mainly from reserved forests (WBFDC, 2004).

Presently, the WBFDC is mainly working to protect the forest and forest products by improving the economic status of forest dwellers (Singh, 2004). The territorial activities of the WBFDC, however, are presently confined within the Kalimpong Division of Darjeeling district in the north of West Bengal only.

> "In this division … [the] corporation is engaged in protection of Forests and Wildlife, raising of plantation, harvesting operation …habitat improvement for wildlife, development of eco-tourism and improvement of surface communication system." (WBFDC, 2006, p. 8)

The Corporation has also taken some initiatives for the development of eco-tourism in West Bengal to recover the socio-economic status of forest dwellers which would have the added advantage of diminishing forest peoples' dependence on forest products. At the same time, though, eco-tourism can create problems for the forest ecosystem as well as the socio-cultural lifestyle of indigenous people.

5.7 West Bengal Tribal Development Cooperative Corporation Ltd. (WBTDCC) and the harvesting of NTFPs

Apart from the Forest Development Corporation, the West Bengal Tribal Development Cooperative Corporation Limited (WBTDCC) is also working through Large Sized Multipurpose Co-operative Societies (LAMPS) for the economic prosperity of forest people, especially tribal people living in or around forest areas in West Bengal. WBTDCC started its work in 1976 following the West Bengal Societies Act, 1973. Its main office is in Kolkata and four regional offices are situated in the districts of Bankura, Purulia, West Medinipur and

Jalpaiguri. Tribal women and children collect a considerable amount of NTFPs (mainly leaves, seeds and some raw materials for cottage industries) each year in the districts of Bankura, Purulia and Midnapur. Therefore, the WBTDCC has opened regional offices in these three districts for the development of these aboriginal people (WBTDCC, 2005a; WBTDCC, 2006).

Presently, there are 135 LAMPS with 284,137 tribal members working all over West Bengal (WBTDCC, 2007b). About 54 LAMPS with 110,642 members are working in the three districts of Bankura, Midnapur and Purulia.

Table 5.3: Numbers of LAMPS in the districts of Purulia, Bankura and Midnapur

Sl. No.	Name of District	Number of LAMPS
1	Purulia	19
2	Bankura	18
3	[West] Midnapur	17
Total		54

Source: WBTDCC Annual Report 2003-2004, Kolkata

These LAMPS, affiliated to the WBTDCC, are entirely controlled by the local forest [tribal] people for their own socio-economic development. The main objectives of these LAMPS are to improve the socio-economic condition of tribal people or forest people living in or around forest areas. LAMPS help tribal forest people mainly in the collection and marketing of Kendu leaves, Sal seeds and Sabai grass from the dry deciduous forest areas of Bankura, Purulia and West Midnapur districts (Report on Activities of WBTDCC, 2007c). The collection of these products can create seasonal employment opportunities for the forest dwellers living in this area.

Tribal women and children of this area play a very significant role in the harvesting of NTFPs including firewood, leaves, seeds and flowers. The forest department of West Bengal has given the monopoly right to the WBTDCC to collect Sal seeds and Kendu leaves through LAMPS. Forest dwellers or Forest Protection Committee (FPC) members collect Sal seeds and Kendu leaves and through LAMPS these products are supplied to industrial units (such as Monorama Infrastructure Pvt. Ltd., Maharastra) or wholesalers in the nearest city. Forest dwellers or FPC members in West Bengal are being paid top prices for these products; higher than in any other State of the country. In the financial year of 2006, WBTDCC spent

Rs. 1,73,14,255.00 for the collection of Sal seeds and Kendu leaves. It is now quite apparent that the collection and marketing of Sal seeds and Kendu leaves through LAMPS could create a great opportunity for forest dwellers to improve their standard of living.

Since 2005, WBTDCC started to collect Babui grass through LAMPS to protect actual collectors from exploitation by mobile agents or middlemen, though the collected amount is very small at present (WBTDCC, 2007c). The involvement of WBTDCC has reduced the risk of exploitation of tribal or forest people by middlemen or mobile agents. In a letter (2415/WBTDCC/A) to the Deputy Director of Backward Class Welfare Department (BCW), the Managing Director of WBTDCC suggested some important measures regarding the collection and marketing of NTFPs, including sal seeds and kendu leaves, in West Bengal.

The necessary measures, as suggested by the Managing Director of WBTDCC, are as follows:

1. Improvement of cold storage centres in the study area and establishment of more storage centres with modern infrastructural facilities.
2. Recruitment of part-time executive officers for each LAMPS.
3. Control of intruders, agents and middlemen in the collection and marketing of NTFPs.
4. Development of good relationships between LAMPS members, *Gram Panchayats* and district level Forest Departments.
5. Waiving the debt or credit of financially insolvent LAMPS.
6. Regular arrangement of training camps, workshops and meetings to increase awareness regarding the socio-economic importance of NTFPs.

Although, both of these organisations have taken initiatives to systematise the harvesting of NTFPs, they have responsibility for only a very small percentage of the annual total production. The limited marketing of NTFPs undertaken by these organisations has created a good opportunity for middlemen and mobile agents to become involved in this sector.

> "There is always a middleman, connected with the trade of NTFPs whether it is consumable items or medicinal plants, who generally keeps contact with Forest Protection Committees (FPCs) or [forest] villagers directly or purchases products from local market [*hat*]. These middlemen have good relationship with the collectors as well as the buyers/ wholesalers so that their bargaining power is kept intact and they always try to buy produces with prices as less as possible while selling at as high a rate as possible." (Banajata, 1993).

Thus, this research will undertake a comparative analysis of how NTFPs are marketed through formal and informal channels and will examine the differences in actual collectors' profits. The limitations of government-organised marketing channels, the importance of middlemen or mobile agent and how the exploitation of actual collectors by middlemen could be minimized will also be examined.

5.8 Conclusion

Although India has the largest professional forest service including 150,000 forest officers presently, only 20.6% of its total geographical area is under forestry. About 54 million tribal and 250 to 300 million rural people still directly or indirectly depend on forest products for their household purposes (Poffenberger *et al.*, 1996). Planned use-control and sustainable use could save Indian forest resources for future generations. In the National Afforestation Programme, steps have been taken to transform barren or unused non-cultivated land into forest areas through massive plantation programmes using traditional as well as modern techniques involving local forest people. State governments have also been offered more power over their forest areas to energise the afforestation programme.

During afforestation, however, it must be taken into consideration that those plants which are useful for forest communities' livelihoods should be planted alongside commercially valuable timber species (Saxena, 2003). Although tribal or forest people use forests and forest products for their subsistence purposes, this usually has far less of an impact on forest ecology than the commercial collection of forest products (Fried, 1975; Gadgil and Iyer, 1989; Shvidenko *et al.*, 2005). Therefore, the current social afforestation programmes are mostly giving emphasis to tribal needs and their lifestyle rather than commercial importance.

With regard to the conservation of forests and forest products in West Bengal, several factors create difficulties. The large number of tribal and non-tribal communities within the forest areas, their forest-based socio-cultural lifestyle, political affairs and the presence of outsiders create pressure on local forests in adverse way. Therefore, the State Forest Department, WBFDC and WBTDCC are now concentrating on fostering single-hamlet based Forest Protection Committee (FPC) to take care of local forests and forest products with the aim of making each FPC responsible for protecting their own forest area. This is because each community knows the socio-physical environment of their forest area (Chowdhuri *et al.*, 1992). Thus, the single-hamlet based FPC can take care intensively of their own forest area.

Now it is clear to the State Forest Department that there is no sense in conducting projects for forest development independently of tribal development. Therefore, this research focuses

on the collection, management, use (domestic and commercial) as well as marketing (formal and informal) of NTFPs available in the dry-deciduous forest areas of West Bengal and investigates the extent to which this can promote the socio-economic wellbeing of native forest dwellers.

Chapter 6

Documentation of NTFPs produced in dry-deciduous forest areas of West Bengal

6.1 Introduction

In general, the forests of Purulia, Bankura and West Midnapur districts can be categorized as the north-east tropical dry-deciduous forest (Group 5 and Sub-group 5) and the sub-type is 5B/C_1c – Dry peninsular Sal – West Bengal laterite tract (Government of West Bengal, Directorate of Forests, 1997). From its name, it is clear that the forests are Sal dominated. In Purulia and Bankura districts, they can be divided into two different types – Sal dominated forest with other miscellaneous species and forests dominated with other species with less Sal. That is why a range of NTFPs are available in these two districts. In West Midnapur district, on the other hand, forests are almost all Sal dominated, so the number of other miscellaneous species is fewer and consequently the number of different NTFPs collected on a regular basis is less.

Work on the documentation of NTFPs has already been achieved in West Bengal by the government as well as NGOs (Das and Chaudhuri, 2004, 2007, 2008 and 2008b; Pal and Das, 2002; Malhotra *et al.*, 1992; Roy, 2003; NAEB Regional Centre – Jadavpur University, 1997; Ramakrishna Mission Lokasiksha Parisad, 1996; IBRAD, 1992; Government of West Bengal – Directorate of Forests, 1997). According to the founder Chairman of IBRAD (elite interview, 18th September 2008), “identification of NTFPs has already been done in all over West Bengal. Scientific names have also been documented. It is now quite clear to the Forest Department as to which part of West Bengal is predominated by which species”.

The Deputy Director in Charge of the Regional Office of the Forest Survey of India, Eastern Region remarked (elite interview, 21st October 2008) that, “... identification of NTFPs has been done. The list has been produced and these lists are included in all the working plans. And these working plans are prepared by the State Government and subsequently approved by the Central Government”. However, the recorded number of the available NTFPs varies considerably in different reports (Malhotra *et al.*, 1992; IBRAD, 1992; Government of West Bengal – Directorate of Forests, 1997; Divisional Forest Officer Bankura (South) Division, 2008; West Midnapur Forest Division Office, 1995). These differences in the recording of NTFPs create a considerable problem when making policy for forests and forest dwellers’ development (Tewari and Campbell, 1995). In this chapter, an overview is given of the

importance of and measures of documenting NTFPs in the districts of Purulia, Bankura and West Midnapur.

6.2 How the NTFPs of the research area could be identified

The accurate and comprehensive identification of NTFPs is a difficult task. This is because some products are important in forest livelihoods, but outsiders do not know about the uses of those products. For some other NTFPs, Forest Department staff, botanists, ecologists or industrial units are familiar with the uses, but forest dwellers are not. According to the Additional Divisional Forest Officer (ADFO) of Jhargram Division, West Midnapur district (semi-structured interview, 27th November 2008), "these [forest] people have their own traditional knowledge in NTFPs. Rather I would say about medicinal plants but they use it excellently. They have certain kind of knowledge which actually we [Forest Department staff] don't have. For these things we need to do some more research work…"

During fieldwork, this issue received particular attention. Forest inhabitants know about lots of herbs which have medicinal value and they use them on a regular basis. However, Forest Department staff or outsiders do not always know about their utility. Thus, these products have not received enough priority regarding commercial harvesting, although they are adequately available in the local forests. Moreover, the markets for these products have not been developed. On the other hand, there are some NTFPs which are used as industrial raw material, but forest dwellers do not know about their uses or the actual market price of those products. If forest dwellers come to know about their multiple uses and importance in the outside world, then certainly they will try to get better prices for these products. Therefore, an exchange of knowledge on the identification of NTFPs is urgently needed between forest dwellers and Forest Department staff, ecologists-environmentalists and industrial units. The available source of knowledge on NTFPs can be roughly divided into two different categories: a) indigenous knowledge and b) Government and NGOs generated knowledge.

6.2.1 Identification of NTFPs using indigenous knowledge

In Purulia, Bankura and West Midnapur districts, forest dwellers have been living in or at the outskirts of forest areas for centuries. They have built up their knowledge on NTFPs through prolonged experience. The Ranger of Ranibandh range in Bankura South Forest Division (semi-structured interview, 6th of November 2008) noted that, "…we [Forest Department staff] take help of local villagers (for the identification of plant species) because they know far better than us". The Regional Director of Forest Survey of India mentioned that NTFPs are recorded from the uses of forest dwellers. Earlier forest dwellers used to collect each and

every household need from the forest. Forests were the source of food, medicine, fodder, house making materials, cosmetics, clothes, jewellery and so on. Each and every plant species was used as a source of subsistence. Over time, the use of plant products has declined because of the increasing use of manufactured products.

The Additional Divisional Forest Officer (ADFO) of Jhargram Forest Division in West Midnapur district (semi-structured interview, 27th of November 2008) thinks local people are the best botanists. They can identify each and every medicinal plant using local names. According to him,

> "So many medicinal plants these local people know. They know about 900 varieties of species of medicinal plants. Out of these, 100-150 species they generally collect and use. Why I am telling you because we [Forest Department] have one medicinal plants garden at Amlachoti in Jhargram Forest Division [West Midnapur district] it is within the jurisdiction of Silviculture South Division; there we have 904 types of species of medicinal plants. All these plants have been collected from local areas including east and west Midnapur districts. Therefore, these people must know all these 904 varieties of medicinal plants. Otherwise, it is not possible for our administration to collect and identify all these 904 products. Local people must know and with their help these medicinal plants have been collected and this garden has been formed."

While Katiyar (2007) carried out his research in Dhamtari Forest Division of Chhattisgarh, he also gave emphasis to indigenous knowledge. In his project report, he specified that, "to assess and prepare a data bank on NTFPs existing in Dhamtari Forest Division, it has been planned to conduct resource survey every year through utilisation of the indigenous knowledge of the local people, using local human resources and local technology" (Katiyar, 2007, p. 9).

The knowledge about forest and forest products is passed from one generation to the next within these forest communities. Thus, outsiders come to know which plants are useful for which purposes from the present generation. In an elite interview, the Chief Conservator of Forest (CCF) – Research Wing, Government of West Bengal (semi-structured interview, 12th of November 2008) stated that, "…they (forest dwellers) are conservative. They don't wish to inform outsiders if they have some information like this".

The most difficult task for a detailed documentation of NTFPs is the assimilation of the traditional knowledge of indigenous forest dwellers with the modern scientific research based knowledge. For this purpose, the West Bengal Forest Department has already started a

three phase project. The State Forest Department research wing is trying to gather indigenous knowledge and then, with the help of plant specialists, they are trying to identify the scientific name, geo-physical requirements and other necessary information to develop the knowledge base which will help to restore the original forest area, simultaneously generating new forests at the fringe areas. The CCF – Research Wing, Government of West Bengal (semi-structured interview, 12th of November 2008) mentioned that,

> "…we (Forest Department) started three phases work. First, is Community Knowledge Register (CKR) – whatever knowledge [forest] community has we are collecting that information and registering that information… we are also entering the name of the information provider so that in future if intellectual property rights comes, then that information provider should get the benefit of that… Secondly, now we have gathered scientists, researchers, paleo-botanists whoever have knowledge of plant communities and we are looking for plants which have been depleted or getting depleted because of the utilisation within the local community so this will give indication that these plants are required…. Why they are collecting those species specifically – the purpose of uses of those plants and we have to know the population density of such species… that will help us where we have to put stress. Finally, after getting information we will go for in-situ[13] – ex-situ conservation."

The villagers from Harinaganj and Kendua in Jamboni block of West Midnapur district said that (group discussions, 04-12-2008 and 14-12-2008), "there are several NTFPs in the local forests and we use them for several household purposes but these NTFPs are not used or collected by outsiders because outsiders do not know about the uses of these products. Therefore, no market has been developed for these products. We are always ready to assist the State Forest Department in this regard because it will help us to earn more money".

Dwellers of Bhuda village in Arsha range of Purulia district (Fig. 6.1) and the Jamdaha village in Ranibandh range of Bankura district know about more NTFPs compared to the forest fringe villagers. They claimed that it is only because their life is intimately associated with the local forest. As the local market is far away and transportation is not good, they try to meet their household demands from forests as far as possible. This is the main reason why remote forest villagers have the greatest knowledge about NTFPs.

[13] In-situ means whatever plants are in the forest area that is considered as the 'gene pool', by virtue of nature these have been grown up and these must be preserved…whereas, ex-situ means, the plant species which are present within the forest area and if they are cultivated outside the forest for the social benefit.

Government of West Bengal
Directorate of Forests,
Office of the Divisional Forest Officer,
/ Purulia Division /

Memo No. 449 /17- Dated, Purulia, the, 5/4/05.

To : The Conservator of Forests,
Marketing Circle, West Bengal.

Sub : Information regarding availability and present marketing system of medicinal plants and other non wood forest products.

Ref : Your letter No.6059/MKT/2M-71/04 dt.14-12-04 .

I am furnishing herewith the different medicinal plants and other non wood forest products in our jurisdiction in the following proforma as desired in letter under reference.

Name of Division : Purulia Division

Name of Medicinal Plant/Non wood forest produce.	Approx present annual availability.	Present system of collection and marketing	Approx revenue earned annualy	Remarks
Rate Rs.50/=per qnt.				
Kalmegh	05 Ton	Localy & through F.P.C.	Rs.2500=00	
Junghi	05 Qnt.	-do-	Rs. 250=00	
Kurchi	1.5 Qnt.	-do-	Rs. 75=00	
Bahera	5 Qnt.600 Kg.	-do-	Rs. 550=00	
Amlaki	2 Qnt.	-do-	Rs. 100=00	
Arjun	10 Ton	-do-	Rs.5000=00	
Ashoke	20 Ton	-do-	Rs.10000=00	
Amlaki	20 Ton	-do-	Rs.10000=00	
Chatim	40 Ton	-do-	Rs.20000=00	
Neem	40 Ton	-do-	Rs.20000=00	
Bahera	40 Ton	-do-	Rs.20000=00	
Bell	40 Ton	-do-	Rs.20000=00	
Rakta Kanchan	05 Ton	-do-	Rs. 2500=00	
Horitaki	10 Ton	-do-	Rs. 5000=00	
Dhudhilata	40,000 piece	-do-	Rs.40000=00	
Jhama	40,000 Piece	-do-	Rs.40000=00	
Ban Sutki	10 Qnt.	-do-	Rs. 5000=00	
Sidha Fal	10 Ton	-do-	Rs. 5000=00	
Assagandha	2 Qnt.	-do-	Rs. 100=00	
Gulancha	2 Qnt.	-do-	Rs. 100=00	
Grithakumari	2 Qnt.	-do-	Rs. 100=00	
Tulshi	2 Qnt.	-do-	Rs. 100=00	
Nayantara	2 Qnt.	-do-	Rs. 100=00	
Nisinda	1 Qnt.	-do-	Rs. 50=00	
Satamuli	6 Qnt.	-do-	Rs. 300=00	
Sarpa ghandha	6 Qnt.	-do-	Rs. 300=00	
Basak	10 Ton	-do-	Rs. 5000=00	
Anantamul	10 Ton	-do-	Rs. 5000=00	
Burilight Chhati	4 Qnt.	-do-	Rs. 200=00	
Sal Chhati	4 Qnt.	-do-	Rs. 200=00	
Gouri Fal	2 Qnt.	-do-	Rs. 100=00	
Sonachhal	2 Qnt.	-do-	Rs. 200=00	
Tentul Bichi	10 Ton	-do-	Rs. 5000=00	
Hartaki	300 Kg.	-do-	Rs. 150=00	
Chhihar lata	2 Qnt.	-do-	Rs. 100=00	
Kusum fal	4 Qnt.	-do-	Rs. 200=00	
Nisindha	3 Qnt.	-do-	Rs. 150=00	
			Rs. 2,23,425=00	

Divisional Forest Officer,
Purulia Division.

Fig. 6.1: Registered NTFPs collected in the Purulia forest division of Purulia district (2004-05)

Source: Divisional Forest Office, Purulia Forest Division, Purulia

6.2.2 Identification of NTFPs by Government and Non-Governmental Organisations

The identification of forest resources in Purulia, Bankura and West Midnapur district was done in 1981-82, under the supervision of Mr. A.B. Chaudhuri, the Joint Director of the Forest Survey of India (Eastern Zone). This was the first government level survey for the identification of plant species. The survey was conducted to obtain a clear picture of types, quantity and quality of forest products existing in these Districts. As the forests with miscellaneous species are found mainly in the hilly areas of these Districts, the diversity of NTFPs is also higher there. Whereas Sal dominated forests are normally seen in the plains, so the number of NTFPs are also less in plains forests (Ministry of Environment and Forests – Government of India, 1985).

Fig. 6.2: Forest villagers collect Haritaki (*Terminalia chebula*) and Bhela (*Semecarpus anacardium*) for commercial as well as domestic purposes in Bankura (25-10-2008 – 11-11-2008) and West Midnapur (right) (15-11-2008 – 20-12-2008) districts

Photo: Ghosal, S.

The species type and density varies considerably in Bankura district based on its physiographic characteristics. Normally uplands, ridges and hills of south-western parts of the District are forested while agricultural plain lands are found in the east. Forests are mainly characterized by Sal species (86% of total plantation including mature Sal, coppice Sal and degraded Sal) and its associates such as T. tomentosa, T. belerica, P. mersupiam and Butea. The southern forest area of the District is quite well-known for the availability of NTFPs including several medicinal plant species, such as Amlaki, Bahera, Haritaki, Bel, Karanj, Kalmegh, Anantamul etc (Fig. 6.2 & Fig. 6.3) (Divisional Forest Officer – Bankura South Division, 2008).

NTFP Collected annually in 12 villages of Ranibandh Block, Bankura, Dist. West Bengal

SL No.	Name of NTFP	Quantity collected in kg			No. of families involved	Price per unit of NTFP	Value of NTFP collected		
		Household use	Sold in market	Total Qty collected			House hold use	Sold in cash	Total
1.	Kendupata	-	66496 (Chhate)	56,496	520 (10 villages)	10/-	-	664960	664960/-
2.	Sapora	1208500 (PCS)	11531000 (PCS)	13739530 (PCS)	461	20/- pcs 1000 pcs	24170/-	230620	254790/-
3.	Saseeds	-	11194	11194	379	2/-	-	758	758/-
4.	Mushroom	716	464	1180	167	<0/-	25640/-	18560	47200
5.	Mahua Flower	11356	16652	28018	510	3/-	34088/-	49956	84,054/-
6.	Kochra	13533	2270	15803	366	3/-	40599/-	6810	47409/-
7.	Mango	3082	7515	10597	132	3/-	9246/-	22545	31791
8.	Jack Fruit	3352	11318	14670	101	3/-	10056/-	33654	43710/-
9.	Jam	730	2901	3631	32	5/-	3650	14505	18155/-
10.	Tamarind	19	-	19	3	2/-	38	-	38/-
11.	Medicinal Herbs	8641	18000	26641	42	5/-	43205	90,000	133205/-
12.	Ku	625	3735	4410	64	2/-	1250	7570	3820/-
13.	Bhutru fruit	58	137	195	19	15/-	870	2055	2925/-
14.	Bamboo	5360 (Basket)	13525 (Basket)	19305	35	3/-	43070	111400	154470/-
15.	Atcnicta								
16.	Custard Apple	30	105	135	4	3/-	90	315	405/-
17.	Gangpata	181	-	181	49	NA	NA	NA	NA
18.	Latex (Atha)	-	756	756	52	2/-	-	15 2	1512/-
19.	Lodhchal	-	240	240	4	1/-	-	240	240/-
20.	Dudhlata	12 p.c.	-	12 p.c	4	NA	NA	NA	NA
21.	Tal	-	50	50	1	5/-	-	300	300/-
22.	Dhuna	89.55	6.5	9605	65	10/-	895	65	960/-
23.	Kurchi	-	226	226	33	1/-	-	226	226/-
24.	Bahera	-	30	30	1	5/-	-	150	150/-
25.	Kalmegh	86	1883	1969	62	1/-	86	1883	1969/-
26.	Anantamul	56	-	56	17	1/-	56	-	56/-
27.	Satamul	45	-	45	17	1/-	45	-	45/-
28.	Rahara	-	250	250	2	1.50/-	-	375	375/-
29.	Kendu fruit	25	-	25	3	3/-	75	-	75/-
30.	Fuelwood	2392760	324211	2716971	678	1/-	2392760	324211	2716971/-
									4215572

* Medicinal plants/fruits are not sold immediately after collection. They wait till dealers come either from Calcutta or Jhargram

Fuelwood - Palash, Perasi, Dhe, Kutus, Chopas, Kurchi, Ahari, Bahera, Asan, Shakai, Kusum, Kend, Harilaki, Bhabri

Fig. 6.3: Registered NTFPs collected in Ranibandh range of Bankura district

Source: Bhattacharjee, 1997, p. 14

In West Midnapur district, the documentation of NTFPs collection, processing, marketing and for the 'analysis of their commercial potentialities' was undertaken by the then West Midnapur Forest Division, Jhargram in 1995. About 53 types of NTFPs were identified in West Midnapur Forest Division area. Ten NTFPs have got priority based on the availability and their economic importance (Fig. 6.4). These are Sal leaves, Mahua flower, Tassar cocoons, Kendu leaves, Kusum, Mushroom, Myrobalans, Piyal, Bhela and different types of medicinal plants including Anantamul, Satamul, Dudhilata, Bhaluksupti, Kalmegh, Kurchi etc. (West Midnapur Forest Division Office, 1995)

However, during the 1981-82 forest survey, timber got priority rather than NTFPs. According to the Government of India, the "Present survey [1981-82] covers the availability of timber, poles, fuel wood and pulpwood. With regard to the availability of minor forest produces no survey was undertaken; only information of exploitation of minor forest produces, as available from the records of the Divisional Forest Officers and other sources, are furnished" (Ministry of Environment and Forests – Government of India, 1985b, p. 30).

There are many other NTFPs found in West Midnapur district. However, either native people are not aware about the uses of these products (mainly used as industrial raw material) or there is no local market to sell them. For example, Dhaw (*Anogeissus latifolia*) gum is used for calico printing, pharmaceutical purposes, paper, petroleum and explosives. Gum from Pea-sal is used for medicinal purposes and the gum of Karaya is important for the textile and cosmetic industry. However, forest dwellers are not aware of such uses and the harvesting or marketing of these NTFPs by native villagers have not received much attention.

A study on the 'Potential of Minor Forest Produce based Industries in the State of West Bengal' was conducted in 2007 by the West Bengal Consultancy Organisation Limited (WEBCON), Kolkata following the order of the Department of Science and Industrial Research (DSIR), Government of India and the Department of Forest, Government of West Bengal. The study aimed to identify those NTFPs that are commercially important. Thus, the research was designed in view of the commercial importance of NTFPs in West Bengal. According to the report, "about 328 types of MFPs [Minor Forest Products] [are] available in the [S]tate of which about 60 items are commercially traded" (WEBCON, 2007, p. 1). The WEBCON has identified a total of 32, 33 and 35 types of NTFPs available in Bankura, Purulia and Midnapur districts respectively.

Rangewise Production of Major NTFP in west Midnapore Divisions (As on 3.10.95)

	NTFP item	Banspahari	Belpahari	Gidni	Jambani	Jhargram	Manikpara	Gopiballavpur	Chandabila	Nayagram	Total
1.	Medicinal	1625.00 Qt	639.00 Qt	307.00 Qt	401.00 Qt	200.00 Qt	102.00 Qt	209.00 Qt	1492.00 Qt	1729.00 Qt	6704.00 Qt
2.	Kendulab	1100.00 Qt	1200.00 Qt	390.00 Qt	398.00 Qt	400.00 Qt	170.00 Qt	589.00 Qt	500.00 Qt	460.00 Qt	5207.00 Qt
3.	Sal leaf	183.00 Qt	207.00 Qt	2140.00 Qt	1089.00 Qt	273.00 Qt	205.00 Qt	204.00 Qt	307.00 Qt	411.00 Qt	6119.00 Qt
4.	Oil Seeds (Sal, Mahul)	1118.00 Qt	1059.00 Qt	311.00 Qt	417.00 Qt	378.00 Qt	235.00 Qt	1376.00 Qt	652.00 Qt	339.00 Qt	5885.00 Qt
5.	Myrobalans	752.00 Qt	302.00 Qt	51.00 Qt	121.00 Qt	118.00 Qt	98.00 Qt	182.00 Qt	303.00 Qt	128.00 Qt	2055.00 Qt
6.	Edible Seeds (Peal, Bhela etc.)	128.00 Qt	82.00 Qt	18.00 Qt	23.00 Qt	8.00 Qt	2.00 Qt	55.00 Qt	68.00 Qt	28.00 Qt	412.00 Qt
7.	Fruits (Amm, Kanthal, Tamarind Peal, Bil, Kendete).	1822.00 Qt	900.00 Qt	100.00 Qt	183.00 Qt	41.00 Qt	23.00 Qt	751.00 Qt	1006.00 Qt	1148.00 Qt	5974.00 Qt
8.	Mushroom Kanthal Tam	53.00 Qt	51.00 Qt	18.00 Qt	23.00 Qt	25.00 Qt	29.00 Qt	41.00 Qt	32.00 Qt	65.00 Qt	337.00 Qt
9.	Gums & resins	68.00 Qt	22.00 Qt	7.00 Qt	32.00 Qt	21.00 Qt	4.00 Qt	24.00 Qt	29.00 Qt	30.00 Qt	237.00 Qt
10.	Mahul (flower)	285.00 Qt	220.00 Qt	111.00 Qt	162.00 Qt	77.00 Qt	73.00 Qt	203.00 Qt	240.00 Qt	288.00 Qt	1659.00 Qt
11.	Tassar cocoons.	29,00,000 No	9,00,000 No	1,00,000 No	1,80,000 No	3,00,000 No	4,00,000 No	30,00,000 No	8,85,000 No	6,75,000 No	93,40,000 No

It has been estimated that from the bove NTFP item on an average each F.P.C member (family) gets about Rs. 780.00 annually, if we add the income from other NTFP also the total average annual income of each family will be above Rs. 1000.00

Fig. 6.4: Identified NTFPs harvested in West Midnapur forest division

Source: West Midnapur Forest Division Office, 1995, p. 16

Among all other non-governmental organisations, the Indian Institute of Bio-Social Research and Development (IBRAD) takes the pioneer position in the systematic study of NTFPs and their role in forest livelihoods in West Bengal. Before their research, NTFPs used to be considered as minor forest products or less valuable products in West Bengal (Founder Chairman of IBRAD, elite interview, 18th September 2008). However, now the belief about the potential of NTFPs has been changing in the State.

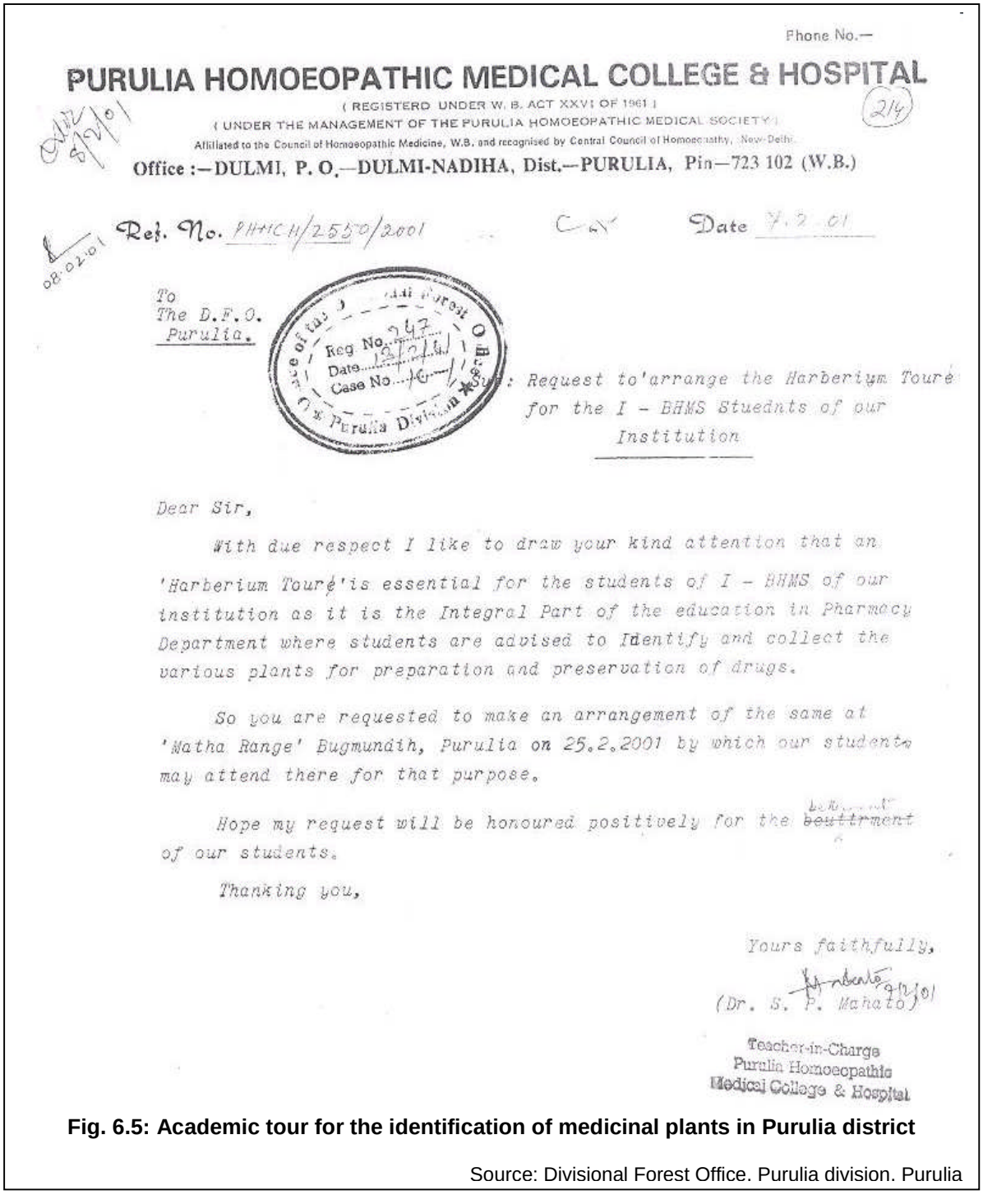
To understand in detail about the NTFPs available in West Bengal, the Forest Department has already launched a project. Five sites have been selected from different areas of West Bengal for this purpose. One of these sites, Gar Panchkot is in Purulia district. In this project, the Forest Department is surveying the total resource base. According to the Additional Divisional Forest Officer of Purulia Division, "this is an 'inventory listing type of work' so that the Forest Department can have an idea about the type and amount of products, which are available in the respective areas. This is currently taking place in some sample areas. With the present infrastructure, it is not possible to organise such a project for every inche of forest area" (ADFO, Purulia Division, Purulia district, semi-structured interview, 30th September 2008).

For the identification of NTFPs, scientists from the Botanical Survey of India visit Purulia district periodically. Basically, they come for two main purposes: (1) the identification of medicinal plants, which come under the category of 'minor forest produce'; and (2) to gather indigenous knowledge regarding the uses of the available NTFPs. The Forest Department of West Bengal has done similar work in the Buxa Tiger Reserve in 2003-04.

> "The Buxa Tiger Reserve is a vast store house of NTFP. The people living in the fringe of forests, who are now member of FPC / EDC, are directly or indirectly benefited by NTFPs. The objective of the study was 1) to identify NTFP present in different blocks and compartments, 2) collect information from different ranges about the quantum of NTFP collection, 3) to identify the status of medicinal plants, and 4) to measure the bio-diversity. Forty (40) numbers of compartments were studied. 120 species of medicinal plants and 100 species in [of] NTFP were recorded in the area of study." (Directorate of Forest, Government of West Bengal, 2004, p. 99)

A parallel initiative is also needed in the dry-deciduous forest areas of south-western West Bengal. Medicinal plants, available in these three districts, have already received attention through academic and non-academic work (Fig. 6.5). However, several other NTFPs are available there which need to be registered in detail. In order to identify all available NTFPs,

the State Forest Department intends to arrange to 'walk' with forest dwellers when they undertake their regular collection of NTFPs. Forest Department staff from Arsha range have already arranged such walks with FPC members (Ranger, Arsha range, Purulia distric, semi-structured interview, 24th September 2008).



Phone No.—

PURULIA HOMOEOPATHIC MEDICAL COLLEGE & HOSPITAL

(REGISTERD UNDER W. B. ACT XXVI OF 1961)
(UNDER THE MANAGEMENT OF THE PURULIA HOMOEOPATHIC MEDICAL SOCIETY)
Affiliated to the Council of Homoeopathic Medicine, W.B. and recognised by Central Council of Homoeopathy, New Delhi

Office :—DULMI, P. O.—DULMI-NADIHA, Dist.—PURULIA, Pin—723 102 (W.B.)

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Ref. No. PHMCH/2550/2001 Date 7.2.01

To
The D.F.O.
Purulia.

Reg No. 247
Date 13/2/01
Case No. G

Sub : Request to arrange the Harberium Touré for the I - BHMS Stuednts of our Institution

Dear Sir,

With due respect I like to draw your kind attention that an 'Harberium Touré' is essential for the students of I - BHMS of our institution as it is the Integral Part of the education in Pharmacy Department where students are advised to Identify and collect the various plants for preparation and preservation of drugs.

So you are requested to make an arrangement of the same at 'Matha Range' Bugmundih, Purulia on 25.2.2001 by which our students may attend there for that purpose.

Hope my request will be honoured positively for the betterment of our students.

Thanking you,

Yours faithfully,
(Dr. S. P. Mahato) 9/2/01

Teacher-in-Charge
Purulia Homoeopathic
Medical College & Hospital

Fig. 6.5: Academic tour for the identification of medicinal plants in Purulia district

Source: Divisional Forest Office. Purulia division. Purulia

For the identification of NTFPs, advanced Remote Sensing and GIS technologies can also be used with reference to ground level sources. The NTFPs species can be identified

through digital image processing using data from satellite remote sensing (State Forest Report West Bengal, 2003-04).

6.3 Types and nature of NTFPs harvested in the study area

NTFPs in the study areas can be identified according to nature of production, use, market demand and local importance. The plant species, from which NTFPs are collected, in these three districts can be divided into four different categories such as: (a) Sal, (b) Sal associate miscellaneous species, (c) other miscellaneous species and (d) herbs and shrubs. The NTFPs are used as food, fodder, medicine, industrial raw materials and other domestic and commercial purposes. Plant parts used include leaves, flowers, fruits, seeds, bark, roots, rhizomes, tuber and gum (Appendix 3).

The highest numbers of NTFPs are collected in Bankura district. The total numbers of NTFPs collected in Ranibandh range of Bankura South Forest Division are 57 (Table 6.3). About 5 types of bark, 6 types of flowers, 20 types of fruits, 12 types of leaves, 5 types of roots and seeds are collected regularly from the local forests. However, the number and quantity of collection varies from one village to another. People living within the forests have better knowledge about the uses of different types of NTFPs than those who live on the edge of forest areas. The communities living within forest areas in Purulia or Bankura district mainly collect NTFPs for their household uses, whereas, those who are living in the fringe areas collect NTFPs mainly for sale at the local market. Thus, they have less knowledge about the types and uses of other NTFPs. It is also true that mainly tribal people live in the forest interior, whereas, scheduled caste and other socio-economically deprived people live in the forest fringe villages and they tend to have less intimacy with the forest.

In Arsha range of Purulia district, about 54 types of NTFPs are identified (Table 6.2). Among them 7 types of bark and flower, 14 types of fruits and 12 types of roots are important. Residents of Bhuda village know about many different types of modified stems and rhizomes and they collect these products throughout the year, but other villagers of the same Range do not know about these all products.

The variation in the use of a particular product is also noticeable. For example, some seeds are used as vegetables by some villagers whereas, other villagers use the same seed for oil production. This is also true in the case of some bark, roots, flowers as well as leaves.

Table 6.1: Different types of NTFPs available in Sirkabad forest beat of Arsha Range, Purulia district			
Sl No.	Parts of plant collected as NTFP	Plant from which NTFPs are collected	*Scientific name*
1	Bark	Bhaluksukti	*Oroxylum indicum*
2		Dangua pan	*Smilex macrophyla*
3		Harla (Haila/Panja)	*Holloptelia integrifolia*
4		Kanakendi (Arjun)	*Terminalia arjuna*
5		Kath pan	*Eresia lebis*
6		Khair	*Acacia catechu*
7		Telhe	*Sterculia urens*
8	Branches / Leaves	Firewood	
9	Flower	Dhatki	*Woodfordia furticosa*
10		Ghentu	*Typhonium trilobetum*
11		Jihur	*Lanea grandis*
12		Keoa	*Costus speciosus*
13		Mahua (*Mahul*)	*Madhuca indica*
14		Sal	*Shorea robusta*
15		Tilai	
16	Fruit	Aam	*Mangifera indica*
17		Amla	*Phyllanthus emblica*
18		Amlaki	*Emblica officinalis*
19		Bahera	*Terminalia bellerica*
20		Ban-khajur	*Phoenix acaulis*
21		Bel	*Aegle marmelos*
22		Bhela	*Semecarpus anacardium*
23		Ghang (Kihor)	*Phaneria vialii*
24		Haritaki	*Terminalia chebula*
25		Jam	*Syzyguim cumini*
26		Kend	*Diospyros melanoxylon*
27		Kul	*Zizyphus jujube*
28		Piyal	*Buchanania lanzan*
29		Ram basak	*Phlogacanthus thyrsiformis*
30	Gum	Sal	*Shorea robusta*
31	Leaf	Amlaki	*Emblica officinalis*
32		Ban-pui	*Basella alba*
33		Bel	*Aegle marmelos*
34		Kachu saag	*Colocasia esculenta*
35		Kalmegh	*Andrographis paniculata*
36		Kanchan (*Kural*)	*Bauhinia purpurea*
37		Kend	*Diospyros melanoxylon*
38		Khar grass	*Cucumis sativus*
39		Khejur Jhuti	*Phoenix sp.*
40		Kulekhara	*Hygrophila auriculata*
41		Paina lata	*Bauhinia volubilis*
42		Sal	*Shorea robusta*
43	Plant	Mushroom	*Agaricus bisporus*
44	Rhizomes	Ban-ole	*Amorphophallus sylvaticus*
45		Bnaula-alu (Khamalu)	*Dioscorea bulbifera*
46	Root	Anantamul	*Hemidesmus indicus*
47		Satamuli	*Asparagus racemosus*
48	Seed	Kurchi	*Holarrhena antidysenterica*
49		Sal	*Shorea robusta*
50	Tuber	Kukui-alu	*Dioscorea sp.*
51		Panja-alu	*Dioscorea sp.*
52	Tuber root	Gethi-alu	*Dioscorea sp.*
53		Sushuni-alu	*Dioscorea esculenta*
54		Thara-alu	*Dioscorea sp.*
Source: Based on questionnaire survey in 2008			

Table 6.2: Different types of NTFPs available in Ranibandh forest beat of Ranibandh range, Bankura district			
Sl No	Parts of plant used as NTFP	Plant from which NTFPs are collected	*Scientific name*
1	Bark	Arjun	*Terminalia arjuna*
2		Bhaluksukti	*Oroxylum indicum*
3		Harla (Haila/Panja)	*Holloptelia integrifolia*
4		Kurchi	*Holarrhena antidysenterica*
5		Lodh	*Symplocos racemosa*
6	Branches / Leaves	Firewood	
7	Flower	Jihur	*Lanea grandis*
8		Mahua (*Mahul*)	*Madhuca indica*
9		Palash	*Butea monosperma*
10		Sal	*Shorea robusta*
11		Simul	*Bombax malabaricum*
12		Tilai	
13	Fruit	Aam	*Mangifera indica*
14		Amla	*Phyllanthus emblica*
15		Amlaki	*Emblica officinalis*
16		Bahera	*Terminalia bellerica*
17		Ban-khajur	*Phoenix acaulis*
18		Ban-kumro	
19		Ban-kundri	*Coccinia grandis*
20		Bat	*Ficus bengalensis*
21		Bel	*Aegle marmelos*
22		Bhela	*Semecarpus anacardium*
23		Bhencha	
24		Bhurru	*Gardenia gummifera*
25		Dumur	*Ficus hispida*
26		Ghee karla	*Momordica dioica*
27		Haritaki	*Terminalia chebula*
28		Jam	*Syzyguim cumini*
29		Kend	*Diospyros melanoxylon*
30		Kurchi	*Holarrhena antidysenterica*
31		Mahua (*Mahul – Kachra*)	*Madhuca indica*
32		Piyal	*Buchanania lanzan*
33	Leaf	Amlaki	*Emblica officinalis*
34		Ban-Khajur	*Phoenix acaulis*
35		Ban-pui	*Basella alba*
36		Bel	*Aegle marmelos*
37		Bat	*Ficus bengalensis*
38		Kalmegh	*Andrographis paniculata*
39		Kanchan (*Kural*)	*Bauhinia purpurea*
40		Kend	*Diospyros melanoxylon*
41		Nageswar	*Desmodium motorium*
42		Parashi	*Cleistanthus collinus*
43		Pia-sal	*Pterocarpus marsupium*
44		Sal	*Shorea robusta*
45	Plant	Mushroom	*Agaricus bisporus*
46	Root	Anantamul	*Hemidesmus indicus*
47		Iswarimul	*Aristolochia indica*
48		Neel kantha	*Polygala crotalarioides*
49		Ramdatunermul	*Smilax ovalifolia*
50		Satamuli	*Asparagus racemosus*
51	Seed	Bhela	*Semecarpus anacardium*
52		Kurchi	*Holarrhena antidysenterica*
53		Kusum	*Schleichera oleosa*
54		Piyal	*Buchanania lanzan*
55		Sal	*Shorea robusta*
56	Stem	Ban-piyanj	*Allium sp.*
57		Ban-rasun	*Allium ampeloprasum*
58	Rhizomes	Bnaula-alu (Khamalu)	*Dioscorea bulbifera*
59	Tuber root	Gethi-alu	*Dioscorea sp.*
Source: Based on questionnaire survey in 2008			

The reasons behind the use of the same product for different purposes by different villagers are manifold. For example, if the local market is close to the forest village, then forest dwellers purchase mustard oil for cooking and other household uses from the local market, whereas, if the local market is distant and Mahua seed is available in the local forest, then they try to produce their cooking oil from Mahua seed in their own house. The economic status of villagers and limited accessibility of modern knowledge are other reasons.

The smallest number of NTFPs was identified in West Midnapur district. There were 18 in total (Table 6.3), with 6 types of fruits and 4 types of roots being especially important. As the forests of West Midnapur district are mainly Sal dominated and the number of Sal associates or other miscellaneous species are less, the numbers of available NTFPs is also fewer.

Table 6.3: Different types of NTFPs available in Jamboni range of West Midnapur district

Sl No.	Parts of plant collected as NTFP	Plant from which NTFPs are collected	*Scientific name*
1	Branches / Leaves	Firewood	
2	Flower	Mahua (*Mahul*)	*Madhuca indica*
3	Fruit	Bahera	*Terminalia bellerica*
4		Bakhar	*Elephantopus scaber*
5		Bhela	*Semecarpus anacardium*
6		Kend	*Diospyros melanoxylon*
7		Mahua (*Mahul – Kachra*)	*Madhuca indica*
8		Piyal	*Buchanania lanzan*
9	Gum	Sal	*Shorea robusta*
10	Leaf	Kend	*Diospyros melanoxylon*
11		Sal	*Shorea robusta*
12	Plant	Mushroom	*Agaricus bisporus*
13	Root	Anantamul	*Hemidesmus indicus*
14		Iswarimul	*Aristolochia indica*
15		Neel kantha	*Polygala crotalarioides*
16		Satamuli	*Asparagus racemosus*
17	Seed	Sal	*Shorea robusta*
18	Rhizomes	Kham-alu (Banola-alu)	*Dioscorea alata*

Source: Based on questionnaire survey in 2008

The number and types of NTFPs varies considerably from one report to another for a single district. An unanimously acceptable documentation is required on NTFPs, produced in these districts. This should help to improve the management of NTFPs in this area. The dependence on timber could also be diminished through the economic progress of forest dwellers by systematic harvesting of NTFPs. To preserve the forest ecology through the improvement of the socio-economic status of forest dwellers, a good marketing system for these NTFPs is essential, and for that a map based on NTFP harvesting is required.

6.4 Importance of the identification of NTFPs

An explicit registration of NTFPs can be helpful to safeguard the forest ecology in various ways. The systematic and sustainable harvesting of NTFPs can improve the socio-economic lives of forest dwellers (Katiyar, 2007; Malhotra *et al.*, 1992). It can also control the over-exploitation of NTFPs. Detailed information on NTFPs might also improve the gene-bank of forest areas in these three districts. According to staff of the Jhargram Forest Division Office of West Midnapur district, "documentation will encourage forest staff and others in interpretation of marketing channels of different NTFPs which will provide FPC members with better knowledge about proper methods of collection, processing, value-addition etc of this [Jhargram] Division" (West Midnapur Forest Division Office, 1995, p. 1).

The identification of NTFPs could also help to monitor the changes in forest density. Where the availability of different types of NTFPs is relatively high, the forest dwellers are highly dependent on the NTFP business and the yearlong collection of NTFPs may reduce the extent of illegal timber felling. Where NTFPs are less important, forest dwellers are more dependent on timber collection for selling as firewood. A comprehensive identification of NTFPs can also help the State Forest Department to plan for the overall progress of forest livelihoods.

Documentation of NTFPs can help in following ways –

1) To estimate the total amount of harvested NTFPs.
2) To assess the distribution of NTFPs according to nature of forest and plant compositions.
3) To reveal the quality and quantity of NTFPs available for domestic and/or commercial purposes including large and small or cottage industries.
4) To examine opportunities for manufacturing value-added products.
5) To disclose those NTFP species which are ecologically well-suited to the local forest and can play a significant role in the economic development of forest dwellers.
6) To explore the relationship between the availability of NTFPs and changes in forest structure or forest ecology.
7) To develop and implement of forest policies considering the forest dwellers socio-economic conditions.

6.4.1 Estimation of the total amount of harvested NTFPs

To make a plan for the development of forests and forest dwellers, it is necessary to know the availability of forest products in different areas. A forest is an important part of most forest dwellers' lives, so without giving due consideration to forest livelihoods, it is not possible to implement a forestry policy with success. An estimation of the total amount of NTFPs available in a particular area can help the Forest Department to decide how much a forest community can harvest from different forest areas. Based on type, demand and marketability, NTFPs can be categorized and future plantations might be made according to that grouping. Information can also be obtained about the ecology of the plant species.

As the most important natural resource of these three districts is forests and a considerable number of people from these three districts are dependent on forest products for their domestic as well as commercial purposes, a clear idea about the availability of different NTFPs is needed by policy makers and those who will be implementing those policies. Based on estimates of total quantity of NTFPs, future policies regarding the collection, storage and marketing can be formulated which support the socio-economic progress of forest dwellers.

6.4.2 Distribution of NTFPs according to forest and plant composition

The identification of NTFPs can reveal the nature of forest and plant composition. Based on this, a map of plant species can be prepared. Following this, forest dwellers could obtain information on which product could be collected from a particular forest area for domestic purposes and which products might be collected for commercial or both purposes.

In general, where the forest is not very dense and there are fewer types of plant species, forest dwellers are predominantly dependent on timber collection, which can reduce the forest area and, at the same time, the quantity and diversity of NTFPs. Therefore, following the distribution of NTFPs, a map could be made to indicate harvesting strategies which would not only help forest dwellers to improve their economic status, but at the same time facilitate the protection of the forest ecology. The ecology of the species which produce NTFPs can also be exposed to the policy makers through the intensive study of NTFPs distributions. The concentration of a specific species in a particular area shows the required geo-physical features for the growing of such plants.

6.4.3 To reveal the quality and quantity of NTFPs available for domestic and/or commercial purposes including large and small or cottage industries

The documentation of NTFPs can indicate how many products can be collected from a specific forest area in a particular year for domestic or commercial purpose. According to Katiyar, "... inventorisation of [forest] resources is necessary to regulate and control the over exploitative market as well as optimize the benefit" (Katiyar, 2007, p. 8). With knowledge of the availability the market system can be better developed. This will help actual collectors to save their transportation cost as well as time of transportation. Katiyar also remarked that,

> "Based on the data base, strategies could be developed to adopt and promote certain species having contemporary market demands thereby improving and broad basing the livelihood opportunities of the people." (Katiyar, 2007, p. 8)

An intensive study on the identification and availability of NTFPs is indispensable for the development of NTFP-based cottage industries.

6.4.4 Opportunities of value-added products manufacturing

Following the documentation of NTFPs, the possibility of value-added product manufacturing may be indicated to forest dwellers. If the documentation of NTFPs is prepared considering their value-addition and if this information is passed on to forest dwellers, this will have potential livelihood benefits for these downtrodden communities. Following that, forest dwellers can be trained in the production, packaging and marketing of those value-added products. Organised marketing centres can be developed in nearby places. Thus, NTFPs which are normally sold for a very meagre price, as the raw material for some value-added products, may be sold as the final product by forest dwellers themselves. This will provide them with lucrative profits and the selling of raw forest products will be reduced.

6.4.5 To find NTFP species, which are ecologically well-suited and can play a significant role in economic development of forest dwellers

With the documentation of NTFPs, it will also become apparent which are essential to keep the local forest ecology intact. Some plants species also help some other miscellaneous species to grow, while other plants create problems for their associates. Documentation should help to make clear which plant species are producing the maximum number of NTFPs as well as being helpful for the growth of their associates to preserve the native forest ecology. This will also help to quantify the amount of resource collection in a certain period of time. Through such documentation, it will be clear which species and which part of these

species should be collected without disrupting the resource base as well as the forest ecology. During the research for his project in Dhamtari, Katiyar (2007) noticed that:

> "Though forest fringe dwellers of Dhamtari extract the NTFPs from the forest for earning their livelihood but there had not been any complete, systematic and reliable data base to assess the resource potential of the forest on the one hand and to calculate the permissible limit of extraction of the target species to ensure off take sustainability to ensure perpetual flow of resources for earning the livelihood." (Katiyar, 2007, p. 8)

When new plantations are made, it should be kept in mind that plants which can produce the greatest number of NTFPs and simultaneously enrich traditional forest features should get priority. For example, eucalyptus seeds are used to produce oil, which can be used for multiple purposes (Harinaganj villagers, West Midnapur district, fieldwork 01-12-2008 – 06-12-2008). However, the over-plantation of eucalyptus can affect the associated plant species and therefore disturb forest ecology.

6.4.6 Explore the relationship between availability of NTFPs and the changes of forest structure or forest ecology

Another important point which should be considered seriously during the time of documentation is that some NTFPs are not widely available, but may have good market value so forest dwellers collect as much as they can of such species. Forest dwellers do not think about the future availability, but if that particular species becomes over-exploited then a gap will be created in the forest eco-chain and that could also affect other associates. For example, several types of shrubs and herbs are found in the forest areas of Purulia, Bankura and West Midnapur districts. Some of these shrubs and herbs are collected on a regular basis as NTFPs, particularly for medicinal purposes. They are very easy to collect. Men, women and children go to collect these products as the height of these species is quite low. Now some of these products, such as Kalmegh, have a good market demand for medicinal and other purposes. However, excessive collection of Kalmegh or other shrubs destroys the ground vegetation and affects the overall forest ecosystem. Therefore, Forest Department staff, forest dwellers as well as policy makers must consider the availability of these NTFPs and their relationships with the present forest ecology.

It is also observed that when a forest community shifts from timber collection to NTFP collection, an enormous impact on the native forest ecology can occur. Similarly, the

variations in the dependency on timber and NTFP collection also influence the forest ecology in different ways. According to Katiyar (2007),

> "While using the natural capital, like a particular NTFP species, to meet the survival need it becomes necessary to examine its critical minimum stock, for the loss of such critical species may cause ecological imbalance which will affect the other species in the forest area as well. Hence, it is important to monitor and assess all the species in the forest area, in order to predict the extinction of any species by assessing its current growth and harvesting pattern." (Katiyar, 2007, p. 6)

6.4.7 For configuration and implementation of forest policies considering the forest dwellers socio-economic conditions

Last but not least, documentation of NTFPs can be useful in making forest policy. Those NTFPs which are important in forest livelihoods, have commercial importance and are important for the forest ecosystem should be identified individually. While forest plans are made, the dependency of forest dwellers on forests should be analysed carefully and intensively. Forest products that are important from the perspective of forest communities should be identified first. The proper identification and optimal uses of NTFPs can improve the socio-economic life style of forest dwellers. On the other hand, this will also help to preserve forest resources in the long run. During his project in Dhamtari area, Katiyar (2007) experienced the problems of excessive collection of NTFPs. He mentioned that, "... inventorisation would serve to provide spatial information regarding NTFPs resource availability and market trends for its better management planning in the future" (Katiyar, 2007, p. 8).

6.5 Conclusion

It is acknowledged that, until recently, the Forest Department was mainly concerned about the harvesting of timber species. As a result, there is a well-organised and valuable database and information of timber products compared to NTFPs. According to the Managing Director of the WBFDC (elite interview, 24th October 2008), "for the last few years we are giving attention. Some data base and information have been generated … but that is still inadequate". The situation is not much changed from 1995, when it was reported that:

> "Very little study has been done yet on NTFP – their identification, method of scientific collection, processing, preservation, value-addition, marketing, regeneration etc. *[In]* This region [dry-deciduous forest areas of south-western part of the State] NTFPs

> provide a major source of income for the FPC people, especially in lean period. It is seen that NTFPs have a very long and complex marketing chain which has led the actual collectors at the village level in an exploited state depriving them from their legitimate shave of earning" (West Midnapur Forest Division Office, 1995, p. 11).

The ADFO of Bankura North Division (semi-structured interview, 7th November 2008) remarked that, "I cannot support [you] too much because I don't have any concrete data regarding the NTFPs collection in Bankura district as because we don't have any research work here earlier".

The same reply has come from the ADFO of Purulia Division. He said (semi-structured interview, 30th September 2008), "...for the identification of all NTFPs more and more research work can only help the State Forest Department. In most cases it is not clear to the Forest Department about the scientific resource base, how many plants are available, what's the status of regeneration, the margin of sustainable harvesting etc".

The CCF – Research Wing, Government of West Bengal (semi-structured interview, 12th November 2008) mentioned that they are trying to have benchmark information regarding the harvesting of NTFPs. This will allow them to understand what is needed for the sustainable management of NTFPs and forest ecology and what are the immediate measures the Forest Departments should take for the systematic harvesting of NTFPs through the socio-economic improvement of forest dwellers to save the dry-deciduous forest ecology. For this purpose, the Forest Department is also trying to involve forest villagers who can prescribe different plants species for different uses including medicinal and other purposes:

> "Particularly in this respect [for the identification of NTFPs] some kind of study is going on that is called 'community knowledge' that we are registering now. This is known as CKR (community knowledge register)" (CCF – Research Wing, Government of West Bengal, semi-structured interview, 12th November 2008).

In 2005, the Research Wing, Directorate of Forest, Government of West Bengal published a book entitled '*Medicinal Plant Resources of South West Bengal*'. This is the first such organised initiative to identify medicinal plants including their 'local and scientific name(s)', 'distributions', 'descriptions', 'flowering and fruiting times', 'ecology', 'uses', 'propagation', 'notes on cultivation' and 'remarks'. Large numbers of these plants (375 species) are available either in the forest areas of West Midnapur district or its adjacent districts. Another document on '*Conservation assessment and management prioritisation for the medicinal plants of West Bengal*' was published in December 2007. However, this concentrates on

medicinal plants, such an initiative is also required for the detailed identification of other NTFPs available in dry-deciduous forest areas of West Bengal (Department of Forest, Government of West Bengal, 2005).

More and more research work, such as the study undertaken by Negi and Bhalla in Himachal Pradesh in 2002 for the systematic documentation of NTFP collection and marketing (Negi and Bhalla, 2002), is also needed in West Bengal. Das and Chaudhuri (2004, 2007, 2008 and 2008b), Pal and Das (2002), Malhotra *et al.* (1992), Roy (2003), NAEB Regional Centre – Jadavpur University (1997), Ramakrishna Mission Lokasiksha Parisad (1996) and the IBRAD (1992) have conducted some research on the identification and use of NTFPs in South Bengal including Bankura, Purulia and West Midnapur districts. However, most of these research projects are focused on the identification, use and marketing of medicinal plants. Only the work undertaken by Malhotra *et al.* (1992) gives a general idea about NTFPs produced all over West Bengal.

Following the works of Agrawal (2007) and Agrawal *et al.* (2008), it can be said that when the traditional and modern scientific knowledge work together, only then can the problems of a comprehensive documentation and forest resource management be solved. An accurate and extensive documentation of NTFPs could help to systematise the harvesting procedure of such products in the State.

Chapter 7

NTFPs and the forest cultures in dry-deciduous forest areas of West Bengal

7.1 Introduction

The nature of the forests of West Bengal varies considerably from one place to another (Department of Forest, Government of West Bengal, 2005). In northern and southern West Bengal, the forest is very dense, whereas, in the south-western part of the State, the forest is scattered. That is why most of the reserved forests, as well as wildlife sanctuaries, are either located in the northern or extreme southern part of the State. As the activities of forest fringe dwellers are restricted in reserved forests or sanctuaries, disturbance in these areas is also limited. On the other hand, in the south-western part of the State, where protected forests are concentrated, forest dwellers or tribals are allowed to collect forest products for their livelihoods. Therefore, the protected forests of this area are steadily degrading.

> "…in reserved forest most of the activities are prohibited while in protected forest some activities are permitted unless it is said that you cannot do it. In unclassed state forest this kind of restrictions are not there. Therefore, in protected forest people are collecting without any hindrance. In reserved forest, however, these things are controlled. Therefore, reserved forests in a sense possess better ecosystem which will sustain itself in perpetuity because the pressures are supposed to be much less. But protected or unclassed state forests are subjected to much more severe pressure. That's why these are more fragile." (APCCF, Govt of West Bengal, elite interview, 23rd October 2008)

As forests are dispersed in the south-western part of the State, it is very difficult to identify villages which are within the forest area and which are not. Thus, people who are considered as forest dwellers collect forest products for their subsistence purposes and, at the same time, those people who are not actually forest dwellers are also collecting forest products for their livelihoods. Therefore, the pressure on this forest area is greater. According to the Additional Principal Chief Conservator of Forest (APCCF), Govt of West Bengal,

> "... in south West Bengal the forests are scattered and in the small patches so it cannot be clearly distinguished that who is living inside the forest and who is living at the fringe. In fact the entire area is fringe. In case of North Bengal, however, there are some villages inside the forest area – people are living inside the forest.... But that is

not the case in South Bengal" (APCCF, Govt of West Bengal, elite interview, 23rd October 2008).

Supporting his comments, the PCCF of the Government of West Bengal (elite interview, 20th October 2008) remarked that in the south-western part of the State, it is very difficult to distinguish between forest and forest fringe areas.

In south-western part of the State, forests are mainly protected. There are fewer restrictions on forest villagers harvesting forest products, so the number of forest dependent people is higher there. Thus, it has become urgent to study the socio-cultural life style of these forest dependent people and their forest based livelihoods. This chapter will focus on these issues with respect to Purulia, Bankura and West Midnapur districts (Fig. 7.1).

Fig. 7.1: The miscellaneous forests of Purulia (left) and Sal dominated scattered forest of West Midnapur districts

Photo: Ghosal, S.

According to the ADFO of Bankura South Forest Division, it is very difficult to say how many forest people are dependent on NTFPs in these districts. Their dependence varies from one place to another and from one season to another. The socio-cultural life style and relationships with the local forest also controls their dependence on forest products (ADFO, Bankura South Forest Division, Bankura, semi-structured interview, 7th of November 2008).

To determine the importance of NTFPs on forest livelihoods of this area, it is necessary to explore the importance of NTFPs in the socio-cultural life of these so-called forest dwellers. According to Malhotra *et al.* (1998), "forest products are numerous and available seasonally. Their collection and pattern of the use varies with socio-cultural and economic condition of each household" (Malhotra *et al.* 1998, p. 167).

However, little work has been undertaken on the importance of NTFPs on forest culture in the study area. This chapter will focus on the various uses of NTFPs in forest culture and the importantce of NTFPs for forest livelihoods in the study area. As value-added product can create a lucrative profit for forest dwellers, opportunities for adding value to NTFPs will also be examined here.

7.2 NTFPs and the forest socio-cultural life

Indigenous forest people have been living for a long time in the south-western part of West Bengal and have been dependent, to a lesser or greater extent, on forest resources (Das, 2005). They are born and brought up in the forest and the impact of forest on their cultural, social and economic life is quite noticeable (Yadav and Roy, 1991; Chowdhuri *et al.*, 1992; Malhotra, 1998). According to the Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region (semi-structured interview, 21st October 2008),

> "...they [forest dwellers] are the part of forest ecosystem. If you want to relate NTFPs to the tribal people of West Bengal, living within or around the forest for a long time, then you have to know their socio-cultural life related with forest and forest products. Their life is associated, their culture is associated, and their ethnology is associated with forest. Therefore, they worship forest. They earn their livelihoods from the forest. And whatever livelihoods they earn from the forest that is basically nothing but the NTFPs. Be it the flowers, fruits, seeds or any forest products … they are using. So whatever NTFPs that we know that has been recorded, they are basically recorded from the uses by these tribal people".

From dawn to dusk, forest villagers use NTFPs for several household purposes. Therefore, their social life is often structured by the availability of forest resources. The more that can be learned about the uses of NTFPs by these villagers, the more appropriate the policies developed by the State Forest Department are likely to be. NTFPs are used here as food, fodder, medicine, decoration, household necessities and other purposes (Roy, 2003; Malhotra *et al.*, 1992 and 1998).

The use of numerous plant species for medicinal purposes is widespread amongst forest dwellers. Normally, if forest villagers get any physical problem, their first port of call is the *Vaidya* (local doctors that make Ayurvedic medicine) rather than a qualified (allopathic) doctor. The *Vaidya* makes medicine using a wide range of plant species, but they do not let ordinary villagers know the composition of the plant species used to produce their medicines, otherwise their business would be affected.

> *"I collect different types of roots to produce medicine. Some types of fruits and barks are also collected to make medicine. But I must not tell everything to you. It is because: I survive on this business only. Now if you tell everybody my tips then my business will fail*."(Medicinal plant specialist, Gurahata village, Arsha range, Purulia district, semi-structured interview – 26th September 2008, the medium of language was Bengali and Santhali)

From the field survey, however, it was apparent that interior forest villagers (such as Bhuda village in Arsha range of Purulia district and Jamdaha village in Ranibandh range of Bankura district) use more NTFPs in their social life compared to forest fringe villagers (such as Sirkabad village in Arsha range of Purulia district and Barudi village in Ranibandh range of Bankura district).

Fig. 7.2: For producing liquor Mahua *(Madhuca indica)* flowers are very popular in tribal communities of Purulia, Bankura and West Midnapur districts, whereas Tilai (right) flowers are used for worship by tribal forest dwellers of Purulia district

Photo: Ghosal, S.

Forest and forest products have many uses in various social events. As villagers in Bhuda explained:

> *"During marriage ceremony we make a temporary shade with different types of plant parts. In native language this is called 'chamra'. Mainly branches and leaves of Sal trees are used but at the same time Mahua (Madhuca indica) and Sidha (Lagerstoemia parviflora) plants are also used for the same purpose. We also use Amlaki (Emblica officinalis) leaves, Bel or Sriphal (Aegle marmelos) leaves for ritual purposes. We use Tilai flower* [Fig. 7.2]*, Ghentu or Bhant (Clerodendrum viscosum) flower, Jam (Syzyguim cumini) flower, Amlaki (Emblica officinalis) flower for different ritual purposes all round the year."* (Villagers, Bhuda village, Arsha range, Purulia

district, group discussion, 24th of September 2008, the medium of language was Bengali and Santhali)

They celebrate quite a few ritual performances in which forest and forest products take an important role. The worship of forests, rivers, hills and wild animals is a longstanding practice among these tribal communities. This is because forest communities believe that their survival depends on the existence of forests, rivers and wildlife. Forests are the main source of flowers, fruits and leaves for ritual purposes. Before collecting an important NTFP, they also worship that particular tree.

> *"We celebrate Jantal puja in the month of June-July when we worship forest-hill-river. During this time we collect different types of leaves, fruits and flowers which are mainly collected from forest only. Apart from this, we also celebrate another religious festival in the month of April-May. It is known as Sarul. During Sarul we use new Sal leaves. Before this festival, nobody collects Sal leaves. Sal flowers as well as Sal leaves are essential for this festival… actually; we worship a Sal tree during this festival. Before this festival, we do not even eat mango. During this festival mango is an essential fruit. This time we also use Sal-gum - it is called 'Dhuna'. However, at present Sal-gum is not widely available in the local forest. Sal -gum is purely collected for domestic uses."* (Villager, Bhuda village, Arsha range, Purulia district, semi-structured interview, 26th of September 2008, the medium of language was Bengali and Santhali)

In the Sirkabad Forest Beat area, there are several tribal forest villages where the celebration of Maghi puja during January – February is quite popular. After Maghi puja, they make new thatch for their house. First, their priest (*Laya*) collects hay or dry grass or twigs (*Khar* grass) from the forest and makes a hut in a particular place in the village. Following that, villagers begin to make the new thatch for their houses. Some years ago, such grass was abundant in the local forest area, but it is quite scarce now, so many villagers use paddy-straw for thatching. It is because of the unavailability of thatching grass, the structure of villagers' houses has also changed. Nowadays, the structure of houses in tribal forest villages of this area is quite similar to those in non-forest villages (Ranger, Arsha range, Purulia district, semi-structured interview, 24th of September 2008).

Other important ritual celebrations are Sohorai and Baha. During the celebration of these festivals, different types of leaves, flowers as well as fruits are collected from the nearest forest. Before collecting new Sal leaves or any other important leaves, worship (called Baha) is performed. Sal, Mahua and Kendu trees are worshipped during this time (Villagers,

Gurahata village, Arsha range, Purulia district, group discussion, 14th of October 2008, the medium of language was Bengali and Santhali).

Gender division in the harvesting of NTFPs in forest communities is common. In general, women and children collect leaves, fodder, firewood, rhizomes, tubers and roots (Fig. 7.3). Men usually work as daily wage labourers. Men also collect NTFPs including fruit, bark, roots and tubers when they do not get any work as wage labourers. Therefore, it can be said that the collection of NTFPs is a secondary job for men, whereas, for women it is their primary occupation. In West Midnapur district, most Sal leaves are collected by women. In Purulia and Bankura districts, Kendu leaves and Kalmegh are mainly gathered by women as well as by children. According to Das (2003, p. 19), "rural women living in forest fringes are the major caretakers and users of forests. Each day they walk long distances to gather fuel wood and fodder. They collect fruits, nuts and small creatures for food for their families. They also use bark, roots and herbs for medicines. Trees provide shade, beauty and environmental protection for their homes. Thus, trees and forests play a major role in their daily lives."

Fig. 7.3: Tribal children and women collect fodder and different types of flowers and leaves from the native forests of Purulia, Bankura and West Midnapur districts

Photo: Ghosal, S.

Collection of NTFPs to fulfil all social needs is not an easy task for these communities. It is time consuming as well as backbreaking. Except for a few NTFPs, which grow well in comparatively thin forests, reductions in forest area and density has been accompanied by a decline in the types and quantities of NTFPs available. As a result, many forest dwellers have been compelled to change their forest-based social lifestyle. According to the Director, NAEB, Jadavpur University, Kolkata,

> "It will automatically change. What life they are living till now is not easy at all and they also wish to get a better life …. Each and every society has improved step by

> step with time and so they will also change one day and that is not very far ….” (Director, NAEB, Jadavpur University, Kolkata, elite interview, 19th September 2008)

During fieldwork, it was noticed that the relationship between interior forest villagers and forests is stronger than in forest fringe villages. The socio-cultural linkages between forest fringe dwellers and local areas have declined in recent years: phenomena that seems to be true for all three Districts of the study area.

The socio-cultural features of a community are often determined by the surrounding environment (Chowdhuri, 1992; Malhotra *et al.*, 1998). The culture of forest communities in the south-western part of West Bengal is no exception. The available forest resources have moulded the cultural life of these forest communities for years. According to the Founder Chairman of IBRAD (elite interview, 18th September 2008),

> “Forest people are born in the forest they grownup [*sic*] in the forest so their lifestyle, their attitude determined by the surrounding natural forest. Their rituals related to birth, death or marriage is noticeably related with forest. They use several plant parts for ritual purposes. Plant parts are collected for food, edible oil, medicinal purpose, for making ornaments, for worship purposes etc.”

In the interior [particularly tribal] forest villages, forests play a major role in local cultural and religious festivals. If the cultural practices of these tribal forest communities are studied carefully a great deal of knowledge about a number of NTFPs will be revealed. From birth until death, the use of NTFPs is obvious in tribal forest communities. The villagers of Jamdaha village in Ranibandh range have shared their views about the importance of NTFPs in their cultural life.

> *“To purify a new-born baby some NTFPs are used such as neem leaf, sal leaf etc. During the marriage ceremony, forest communities use branches of Jam (Syzyguim cumini) and Sal. Mahua leaves and flowers are also used for marriage. Liquor is made from Mahua flower.”* (Villagers, Jamdaha village, Ranibandh range, Bankura district, group discussion, 27th of October 2008, the medium of language was Bengali and Santhali)

The purposes and use of NTFPs in these forest communities is sometimes distinctly different to the normal uses of NTFPs. For example, outside the forest, Sal leaves are mainly used for plate making, whereas in the cultural life of forest villages, they have many uses.

> "*Forest and forest products are used in most of our socio-cultural festivals. When a new baby is born in a tribal family then the family members will offer oil to other tribal families within the community. During this time we use a bowl made of Sal leaves to serve the oil. It is still an unavoidable custom in tribal communities. We only use Sal leaves; no other leaves are used for this purpose."* (Villager, Bhuda village, Arsha range, Purulia district, semi-structured interview, 26th of September 2008, the medium of language was Santhali)

As Sal, Mahua, Karanj, Kusum and some other plant parts have several uses in forest cultural life, these plants are widely worshiped. A culture of protecting these particular plant species has grown up among some of the forest communities. They try to follow it at all costs. They do not start to collect newly sprouted leaves, flowers or fruits of these species until worship has been performed. This is just to maintain a future supply of these plant species (Ranger, Arsha range, Purulia, semi-structured interview, 24th September 2008).

> "The main tribal communities of the [Bankura] District consist of Santhals, Oraon, Munda, Bhumiz, Kaora, Mahali, Kheria and Malpahariyas. Of these communities, Santhals have got specific attachment to forests. They regard certain categories of trees in the forests as their own property and try to resist any action organise to cut, remove and replace the same by different types of species in the area. Fruits and flowers of trees like Mahua, Karanj, Kusum, Sal etc are collected by the local population for eating and extraction of edible oil etc and hence they have got an inherent tendency to protect these seedlings wherever these are found." (Forest Survey of India, 1985, p. 11)

In the past, some forest areas used to be considered as sacred areas, from where the collection of any type of forest product was prohibited. Forest inhabitants used to believe that the God of the forest might live in that area so they should not disturb it in case the forest God would be annoyed and the forest destroyed (Bhakat and Pandit, 2003; Gadgil and Vartak, 1975). Forests were also protected to as a means of sustaining forest livelihoods and protecting villagers' livestock. Normally, if they needed any medicinal plants they used to collect from these sacred areas, as they believe that forest Gods have bestowed their blessing on these plants species. Therefore, these areas have largely been protected.

> "Sacred groves are tracts of near-virgin forests, the vestiges of an ancient practice in which people protected forest patches. A repository of medicinal plants.... Sacred groves are small patches of native vegetation traditionally protected and managed by local communities. Named differently in different parts of India, these groves are mainly

> found in tribal dominated areas and managed by local people for various reasons. ... Sacred groves, in general, act as a nursery and storehouse of many of the local ayurvedic, tribal and folk medicine." (Bhakat and Pandit, 2003, p. 230)

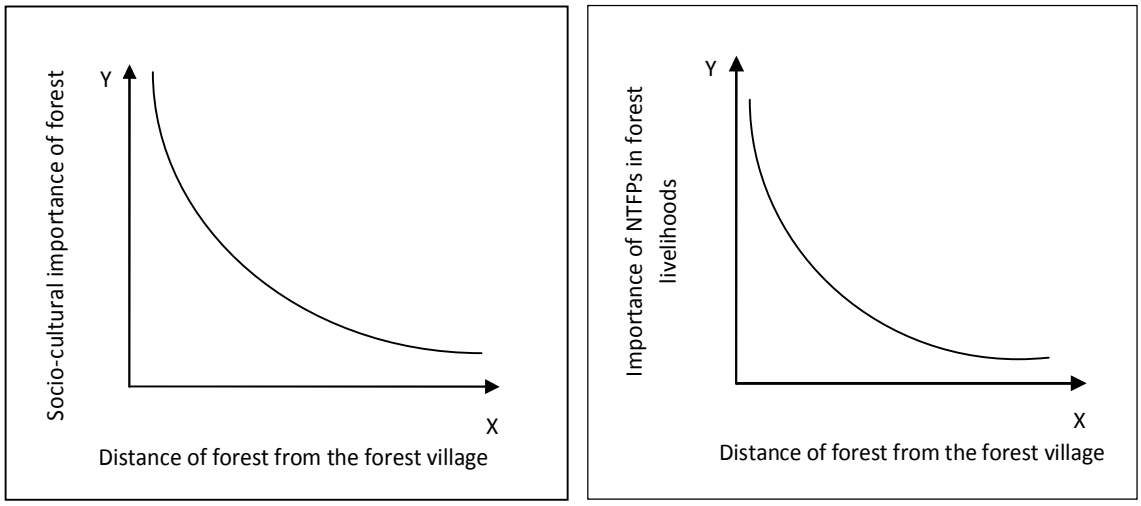
Such a sacred grove is found at Chilkigarh area in Jamboni block of West Midnapur district. The area is well known for the temple of Goddess Kanak Durga.

> "Chilkigarh, a village of Gidhni police station [in Jamboni forest range area] under Jhargram sub-division of Midnapur (now West Midnapur) district, harbours a forest patch which is spread over an area of 58 acres on the east catchment zone of the Dulong river. This forest houses the famous temple of *Kanak Durga*. The entire forest area seems to represent the relict vegetation in its climax stage. Although there is no taboo whatsoever associated with the forest or any plant, the entire landscape has been conserved out of respect to the Goddess Durga." (Malhotra *et al.*, 1997 in Bhakat and Pandit, 2003, p. 224-225)

There are quite a few cultural festivals celebrated by forest communities in the study area during the course of the year. Many of these demonstrate the importance of forest and forest products in forest village culture. As a result, forest management initiatives must give proper consideration to the cultural practices of local forest dwellers.

> "It may be suggested that enough care have to be taken before selecting plants for aforestation. The trees which are useful for tribal life and culture should get priority in this matter. It is true that the tribals utilise the forest produces for their existence but they never exploit it to that extent or use it commercially which may cause massive depletion" (Chowdhuri *et al.*, 1992, p. 47).

At present, the State Forest Department is trying to reduce the pressure on forests by diverting forest dwellers to other occupations, whilst maintaining their indigenous culture. With their livelihoods constantly changing, however, the socio-cultural features of these aboriginal forest communities will also change. Graph 7.1 suggests that socio-cultural and subsistence-related dependence on NTFPs declines with the distance of rural forest villages from the forest area. However, the slope of the curve is quite gentle here. Rural villagers that are living about 10 km away from the forest area still use some forest products for their household purposes, but due to improvements in the socio-economic status of forest communities associated with the introduction of manufactured products, high levels of dependency on forest products are not found at any level, even at the most remote village in the study area.



Graph 7.1: Variations in the dependency on NTFPs for socio-cultural and household economy purposes with forest-village distance

Source: Based on field survey including interviews and group discussions with forest dwellers, participatory appraisal and participation and direct observation

7.3 Household economy and the NTFPs

NTFPs have an important role in forest livelihoods in the south-western part of the State, (Tewari and Campbell, 1995). Forest communities, especially tribal people are highly dependent on the collection of forest products for their domestic as well as commercial needs. The economic importance of NTFPs in forest livelihoods can be divided into two categories – a) collection of NTFPs for household needs, for which they do not pay any money but, if they purchase those products from the market, then they have to spend money for that; and b) collection of NTFPs for marketing or commercial purposes, from which they earn money which they use for various purposes. The commercial importance of NTFPs of this area has already been studied by several scholars (Malhotra *et al.*, 1992; FAO, 1991a;

Roy, 2003; Chowdhuri *et al.*, 1992). However, very little work has been done to date, to calculate the monetary value of NTFPs, used for household needs. Chowdhuri *et al.* (1992) and Yadav and Roy (1991) have done some work on the uses of NTFPs in forest communities in southern Bengal, but this research focuses little on the value of NTFPs used for domestic purposes. The main problem in this regard is that the collected amount and the number of NTFPs vary from one year to another and every household does not get an equal amount of each product. In addition, it is very difficult for a researcher to visit all the houses in remote forest villages to find out the total amount of harvested NTFPs for commercial, domestic or both purposes. This would be a very time consuming and dangerous task (because of Maoist activity) as these villages are widely scattered. It is also true that forest villagers cannot (or sometimes do not) recall the exact amount of NTFPs that they collect from the forest and the price also varies temporally. As a result, calculations of the value of NTFPs collected are based on estimations of average annual collections, market price and amount of household use.

However, the importance of NTFPs in forest livelihoods in the study area cannot be underestimated. NTFPs have an important role in the livelihoods of tribal people living inside the forest area as well as those who are living at the forest-fringe area in the dry-deciduous forests of South Bengal. For their domestic purposes, they depend greatly on NTFPs. They collect leaves and firewood for fuel purposes on a regular basis. For other domestic purposes including food, fodder and medicine, they also collect several types of NTFPs. According to the Assistant Managing Director of WBTDCC:

> "It has been calculated that only in Bankura district the total annual turnover from NTFPs is not less than Rs. 500/- million. Because when I was the Additional Divisional Forest officer of Bishnupur Forest Division of Bankura District during that time I had done some works on NTFPs collection and I found that forest and forest-fringe people of Bankura district are entirely dependent on the collection of NTFPs, particularly *Sal* leaves and *Kendu* leaves." (Assistant Managing Director, WBTDCC, Kolkata, semi-structured interview, 16th September 2008)

According to the NAEB staff members, plenty of NTFPs are collected on a regular basis for daily domestic purposes by forest dwellers in the south-western part of West Bengal. When NAEB conduct projects for the development of this fragile forest ecosystem, they then recognize how forest resources are important in forest livelihoods.

The importance of NTFPs within the household economy is greater where other income sources from agriculture and wage labouring are limited. Poor transportation, distance to the

local market, limited availability of manufacturing products additional other reasons for the high levels of dependence on forest products in remote forest villages. It is because of these reasons, the importance of NTFPs for household purposes in the interior forest areas of Purulia district is higher than in Bankura and West Midnapur.

In Bankura and West Midnapur districts, forest communities make a good deal of money each year selling Sal plates, Sal seeds, mushrooms and some other NTFPs, while, the uses of NTFPs for household purposes is less there than in Purulia district (Villagers, Kendua village, Jamboni range, West Midnapur district, group discussion, 9th of December 2008, the medium of language was Bengali).

In Purulia district, the number of NTFPs used for domestic purposes is higher than the number of NTFPs sold at the market. During fieldwork, the economic value of NTFPs, which are gathered for different household purposes, was examined with reference to information provided by the Forest Department staff and forest villagers. According to the Forest Survey of India Eastern Zone record,

> "Forest is the most important natural resource of the District [Purulia]. The rural population rely heavily on the forests for meeting their day to day needs of fuel wood, fodder for their cattle and also partly for earning their livelihood. The rural population, specially the tribals, during the period of private ownership of forests enjoyed rights and privileges over the forest produce in the neighbouring forests through which they used to meet their needs. The life of the tribal population, their culture and religion revolved greatly round the forests. Their almost self-sufficient economy was also based on the produce derived from these forests. Collection and subsequent sale of produce like Sal seed, Kendu leaves, Mahua fruits and flowers, Tassar etc served as sources of auxiliary income. Thus the forests provide a support to the rural economy of the region." (Forest Survey of India Eastern Zone, 1985, p. 16)

The purpose of collection, however, varies from one community to another. For example, those communities which are located within the forest collect large amounts of NTFPs to fulfil their household needs. The villagers from Bhuda, a village located within the Ajodhya hilly forest area mentioned,

> "*We collect forest products including fodder, firewood etc. Whenever we see we need anything which is available in the forest, we go to collect that product. Our house is within the forest area so at least one person from each family goes to collect forest products every day…. We mainly collect for domestic purposes but sometimes go to*

sell some items to the nearest market known as 'hat'." (Villager, Bhuda village, Arsha range, Purulia district, semi-structured interview, 22nd of September 2008, the medium of language was Santhali)

Forest fringe villagers, such as of Gurahata, Sirkabad and Kalaboni village of Purulia District, collect most of their NTFPs to sell rather than for household use. Thus, inter-district and intra-district differences in the purpose of NTFP harvesting are quite apparent. Based on the availability of the product in a year, their monetary value, amount of collection, usability and commercial as well as domestic importance, the ten most important NTFPs of these three districts have been ranked separately. The position of NTFPs in the rank varies from one area to another in the same District as well from one District to another. These rankings were derived from discussions with forest dwellers (Fig. 7.4, 7.5 and 7.6). The ten most important NTFPs in Arsha range of Purulia district are as follows (Fig. 7.4):

Sl No	Name of NTFPs	Availability	Quantity of product collected in a year / Household	Commercial importance	Household importance	Monetary value of the product	Multiple uses of the product	*Grade
1	Firewood	Whole year	>3,000 kg	√	√	Rs. 2/kg	√	5
2	Sal (leaf)	8 months	24,000 plates	√	√	Rs. 50/1,000 plates	√	5
3	Bel (fruit)	2 months	30 kg	√	√	Rs. 2/kg	√	5
4	Haritaki (fruit)	3 months	15 kg	√	√	Rs. 2/kg	√	5
5	Amla (fruit)	2 months	10kg	√	√	Rs. 3/kg	√	5
6	Kend (leaf)	2 months	15 *Chata* (Bundle)	√	√	Rs. 25/ Chata		4
7	Harla (bark)	2 months	20 kg	√		Rs. 15/kg		4
8	Jam (fruit)	1 months	10 kg	√	√	Rs. 5/kg		4
9	Kham-alu (tuber root)	2 months	20 kg		√			3
10	Genthi-alu (tuber root)	2 months	15 kg		√			3

Fig. 7.4: Ten most important NTFPs in Arsha range of Purulia district (ranked by forest villagers)

*Grade: 5 – most important; Grade: 1 – less important Source: Based on questionnaire survey

With respect to the importance of NTFPs in the household economy, villagers from Katiam village in Ranibandh range of Bankura district have remarked that,

"For our needs we have to save this forest. Those plants which produce more than one NTFP or is important for timber as well as NTFP, those plants we have to protect anyhow. Like from Mahua or Mahul (Madhuca indica) tree, we get flower and fruit and

> *from fruit we get seed – all are useful for different purposes. We collect all these products for domestic as well as commercial purposes. Therefore, we have to protect Mahua tree at any cost. Same for Sal, Piyal etc.* (Villagers, Katiam village, Ranibandh range, Bankura district, group discussion, 11th of November 2008, the medium of language was Bengali)

According to the APCCF, Government of West Bengal (elite interview, 23rd October 2008), indigenous people have a long settlement history in the forest areas of Purulia, Bankura and West Midnapur districts. They comprise mainly of tribal and other disadvantaged classes of society. Therefore, these people depend on forests to a very large extent for their various needs and they are permitted to go into the forest to collect various NTFPs. He also added that a "survey has been done in some parts of south West Bengal … where it has been found that the income of these fringe households from the collection of NTFPs is much higher compare to other usufructs" (APCCF, Government of West Bengal, elite interview, 23rd October 2008).

Sl No	Name of NTFPs	Availability	Quantity of product collected in a year / Household	Commercial importance	Household importance	Monetary value of the product	Multiple uses of the product	*Grade
1	Sal (leaf)	8 months	>50,000 plates	√	√	Rs. 70/1,000 plates	√	5
2	Firewood	Whole year	>2,000 kg	√	√	Rs. 1.5/kg	√	5
3	Mahua (flower)	2 months	20kg	√	√	Rs. 5/kg	√	5
4	Bel (fruit)	2 months	30kg	√	√	Rs. 5/kg	√	5
5	Mushroom	4 months	25kg	√	√	Rs. 10/kg		4
6	Kalmegh (leaf)	3 months	20kg	√	√	Rs. 2/kg		4
7	Kend (leaf)	2 months	20 Chata (Bundle)	√	√	Rs. 20/Chata		4
8	Kend (fruit)	1 month	10kg	√	√	Rs. 10/kg		4
9	Jam (fruit)	1 months	10kg	√	√	Rs. 10/kg		4
10	Lodh (bark)	2 months	20kg	√		Rs. 2/kg		3

Fig. 7.5: Ten most important NTFPs in Ranibandh range of Bankura district (ranked by forest villagers)

*Grade: 5 – most important; Grade: 1 – less important Source: Based on questionnaire survey

On the other hand, the Director of NAEB, Jadavpur University, Kolkata (elite interview, 19th September 2008) thinks that, as 40 per cent of the poorest people of the State are living within or at the forest fringe in the south-western part of West Bengal, the first thing that Forest Department has to do is to eradicate poverty amongst these marginal people. For this purpose, different Government Departments must work jointly. Collaboration between

different Government Departments is very important for the improvement of forest-based livelihoods and, at the same time, for addressing the degradation of forest ecosystems.

> "Another issue related to poverty and livelihood of Bankura is dependence on forest from time immemorial. If the settlement map of Bankura is superimposed over land use map, one will find that there are numerous small hamlets in the fringe areas of forest lands. The inhabitants of these villages are mostly tribals or people belonging to lower castes. Forests are trees have customarily played a critical role in the livelihood of these people. They depend fully or partly on forest resources to meet their subsistence needs. They have an organic link with forest. For them, forests are also a source of construction material, fuel, medicines, animal feed and as such they are helplessly dependent on forests." (Development and Planning Department, Government of West Bengal, 2007, p. 55-56)

In Purulia and Bankura districts, most of the forest fringe villagers have no cultivated land, while villagers living inside the forest possess a marginal amount of cultivated land within the forest. These cultivated lands were produced through slash and burn in the past. Normally, they grow rainfed crops during the monsoon (June to September). As irrigation is not available within the forest and the land is of rather poor quality, yields tend to be poor so they cannot depend fully on agriculture for their subsistence. Thus, the collection of NTFPs has become an important activity for these people. It has been estimated that each year about 20 – 50 per cent of household incomes comes from NTFP harvesting in the forest areas of Purulia, Bankura and West Midnapur districts (Development and Planning Department, Government of West Bengal, 2007, p. 56). According to the Jamdaha villagers in Ranibandh range of Bankura district,

> *"We are all tribal people living in this village. There are 19 households in total. We have been living here for hundreds of years. Our main profession is agriculture, as we have some cultivated land within the forest area. Apart from that we collect forest products for our domestic purposes as well as to sell. We all are FPC members so we get jobs from the Forest Department. When the Forest Department plant trees they ask us to work for them and they pay us. During their scheduled fellings, they also call us and again they pay us a wage for that. We protect this forest area so we are allowed to collect fodder, firewood, leaves, fruits, flower etc from the forest in free of cost. We also work sometimes as wage labourers or agricultural labourers but that is very irregular."* (Semi-structured interview, 29th October 2008, the medium of language was Santhali)

It is also the same in Katiam village in Ranibandh range of Bankura district. Although it is a forest fringe village, the importance of NTFPs within the household economy is quite noteworthy. The total number of households in the village is about 140 including three different communities. One of these communities, named Sabar, is one of the poorest tribal communities in India and is highly dependent on forest product collection as they do not have any cultivated land or any other source of income. All the residents of this village collect their firewood from forest areas. Half of the villagers are completely dependent on forests, while others do some agricultural work on their own land or work as agricultural wage labourers. However, at least one person from each household goes into the forest everyday to collect firewood and, at the same time, if there is any, they also collect fruits, roots, bark, leaves and flowers. Almost all households collect Sal leaves to make Sal plates and they sell those plates at the local market as it is located at Ranibandh, just about 2 km away from the village (Group discussion, 11th of November 2008, the medium of language was Bengali).

Sl No	Name of NTFPs	Availability	Quantity of product collected in a year / Household	Commercial importance	Household importance	Monetary value of the product	Multiple uses of the product	*Grade
1	Sal leaf	8 months	>100,000 plates	√	√	Rs. 60/ 1,000 plates	√	5
2	Mahua flower	2 months	20 kg	√	√	Rs. 10/kg	√	5
3	Kend leaf	3 months	20 *Chata* (Bundle)	√	√	Rs. 30/ *Chata*		4
4	Mush-room	3 months	50 kg	√	√	Rs. 10/kg		4
5	Sal seed	2 months	100 kg	√	√	Rs. 5/kg		4
6	Mahua fruit	1 month	10 kg	√	√	Rs. 10/kg		4
7	Fire-wood	Whole year	2,000 kg		√			3
8	Piyal fruit	1 month	5kg	√	√	Rs. 6/kg		3
9	Sal gum	Whole year	1kg	√	√	Rs. 80/kg		3
10	Bhela fruit	2 months	3kg		√			2

Fig. 7.6: Ten most important NTFPs in Jamboni range of West Midnapur district (ranked by forest villagers)

*Grade: 5 – most important; Grade: 1 – less important Source: Based on questionnaire survey

According to Tewari and Campbell (1995), in West Midnapur district most of the village, communities obtain about 17 – 50 per cent of their annual household incomes from NTFPs harvesting. Although the village communities of West Midnapur district are better off compared to Purulia and Bankura districts, the economic importance of NTFPs in forest

livelihoods cannot be ignored there. The number and type of NTFPs used by forest fringe communities is less than in Purulia and Bankura districts.

7.3.1 Value-added NTFPs and the forest livelihoods

NTFPs have domestic value as well as commercial. Apart from these two direct uses, NTFPs can also be used to produce value-added products. Unprocessed NTFPs are sometimes given less commercial as well domestic importance compared to value-added products as the use value of the secondary products is greater. For example, some bark, leaves and flowers, when collected from the forest areas are sold for very low prices, yet when the same products are used to make secondary products, the prices become much higher.

> "Other estimates suggest that up to 35 per cent of the income of tribal households in India comes from the collection of unprocessed NTFPs... Small scale forest-based enterprises, many of them based on NTFPs, provide up to 50 per cent of income for 20 to 30 per cent of the rural labour force in India." (Tewari and Campbell, 1995, p. 54)

In the dry-deciduous forest area of Purulia, Bankura and West Midnapur districts, Sal leaf collection is a popular job for most forest households. Sal leaves are stitched by hand to produce Sal plates, which are popularly known as *sia-pata* (hand stitched Sal plates). The price of such plates is quite low. However, after the introduction of Sal plate making machines, the quality of plates has become much better and these are now even used in popular hotels and restaurants in Indian cities (Fig. 7.7).

The machine-made plates are expensive (due to electricity and other costs) compared to handmade ones, so rural people do not normally use such plates. Local demand for machine-made plates is therefore low, so local agents or businessmen tend to purchase these plates and send them to the town or city market. These local agents often try to pay forest dwellers as little as possible. That is why forest dwellers are not interested in producing such plates themselves.

> "Each stage, from Sal leaf to *sia-pata* (hand stitched Sal plate) to plate [mechanised], involves value-addition and the maximum value-addition takes place in the process of making Sal plates. Unfortunately the traders and commercial entrepreneurs dominate in this last stage of value addition." (Development and Planning Department, Government of West Bengal, 2007, p. 56)

Fig. 7.7: Different types of Sal plates produced by forest villagers

Photo: Ghosal, S.

Although, some forest dwellers have obtained plate-making machines from the State Forest Department, many prefer to produce hand-stitched plates, which are cheap and have a good local demand and can be sold directly to the purchasers at the local market. As a result, the likelihood of being exploited by this marketing system is less. If a well-organised marketing system for mechanised Sal plates were to be developed, then forest dwellers might be more interested in producing such plates as they are more lucrative than the hand-stitched plates.

> *"We all collect Sal leaves from this forest area and stitch them by hand to make plates. After drying, we sell these plates. We sell Sal plates year-round. Sal leaves are collected by male, female as well as child members. We use Sal plates very little in our house but mostly we make it to sell. Each household can earn Rs. 1500/- per month by selling Sal plates... We also collect Mahua fruit it is locally known as Kachra. About 10 kg of Kachra is collected in a month by each household. We eat the fruit and produce oil from Kachra seeds. This oil is used for cooking purpose as well as body oil. Kachra we don't sell, it is purely used for domestic purpose."* (Villagers, Harinaganj village, Jamboni range, West Midnapur district, semi-structured interview, 5th of December 2008, the medium of language was Bengali)

The Mahua flowers are also used to make liquor and as a vegetable and the seeds (*Kachra*) are used to produce oil. The oil has a range of uses – it can be used as an edible oil and massage oil but there is no good marketing system for such value-added products. The liquor produced from Mahua flowers is very popular among [tribal] forest dwellers. The same liquor can be manufactured scientifically and systematically to enhance its marketability to the outer world. During the making of oil from Mahua flower, a typical type of wax is produced that is also used for several household purposes (such as mosquito coil, pain balm

etc) by tribal forest dwellers (Fig. 7.8). However, people from outside the forest area do not know about the uses of such products. Therefore, forest dwellers have no outlet to sell these value-added products at a good price. In order to encourage better management of the dry-deciduous forest areas of this region and to reduce the forest dwellers' dependence on timber products for subsistence purposes, urgent initiatives are needed regarding the manufacturing of value-added products in Purulia, Bankura and West Midnapur districts.

> "Training for value addition products could help for the improvement of economic condition of forest dwellers because every NTFP fetches enormous price differences if there is a post-harvest processing and management." (ADFO – Purulia Division, Purulia, semi-structured interview, 30th September 2008)

Fig. 7.8: Mahua seed (*Kachra*), oil and wax (left)

Photo: Ghosal, S.

According to Shushni villagers in Jamboni range of West Midnapur district (group discussion, 18th of December 2008, the medium of language was Bengali), "*there are 75-80 households in the village and all except for two or three households are dependent on the harvesting of forest products, particularly the collection of Sal leaves*". The scenario is the same for most other forest villages in the District. Nearly all of these forest dwellers, especially women and children, go to the forest on a regular basis to collect Sal leaves which they make into leaf plates for sale at the local market or to mobile agents. At the moment, this activity is their main profession.

Another important NTFP which is collected on a regular basis in Bankura district is Babui grass, which is used for rope making. Such types of rope have multiple uses. This is a value-added product, which commands a much higher price than unprocessed Babui grass. The

WBTDCC collects Babui grass occasionally, but they do not have enough storage facilities for this product, unlike Kendu leaves or Sal seeds. Therefore, most Babui grass sales are undertaken by local agents or middlemen and because of this, the actual collector often gets very low prices.

> "...both male and female members of tribal families of south Bankura are efficient in making Babui rope which has steady demand in the markets within the State, as well as in other states like Uttar Pradesh and Rajasthan. But in absence of local market facilities, the middleman dominates which leads to deprivation of the growers of competitive price." (Development and Planning Department, Government of West Bengal, 2007, p. 56)

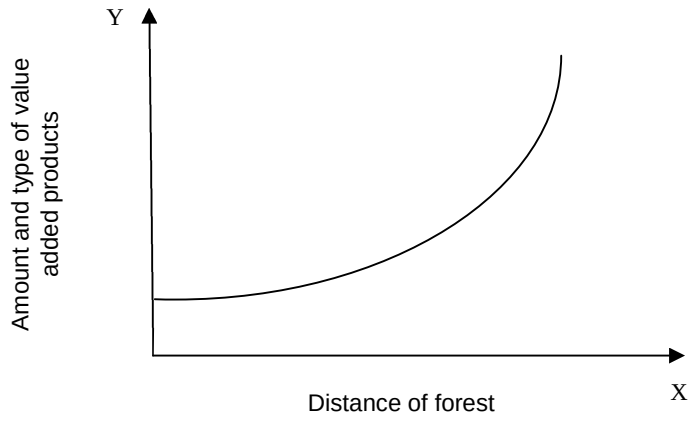
The same problem occurs with respect to the Eucalyptus oil business. According to Harinaganj villagers in Jamboni range of West Midnapur district (group discussion, 2nd of December 2008, the medium of language was Bengali), "*there are lots of Eucalyptus trees in the local forest and their leaves are used to produce oil. This oil is used for several purposes including industrial raw materials for cosmetic products, but there is no proper marketing system developed to sell such oil so nobody is interested in collecting Eucalyptus leaves. At present, there is no industrial demand for the collection of this leaf for oil production*".

Fig. 7.9: Date leaves (*Khajur – Phoenix dactylifera*) and Sal leaves are dried in the sunshine. Date leaves are used for making mat (right); whereas Sal leaves are used to produce plates and bowls
Photo: Ghosal, S. and the Department of Forest, Government of West Bengal

Graph 7.2 shows that with increasing of distance from the forest, the use of value-added NTFPs increase. This figure supports the 'distance decay model' (Taylor, 1971) and Von Thunen's findings (Hall, 1966) on the effects of distance and transaction costs. In remote villages, only hand-stitched Sal plates (*sia-pata*), mats (Fig. 7.9) and *bidi* (cigarettes) are manufactured as value-added or secondary products. A few types of oil and liquor are also

produced as secondary products from NTFPs in remote villages, but they are hardly ever marketed. In contrast, people living close to market areas or in district towns purchase raw NTFPs from mobile agents or middlemen and manufacture different types of value-added products. They also sell them locally as well as sending them to urban areas for further processing and marketing. This is also true for most of the medicinal plants harvested in Purulia and Bankura districts.

Graph 7.2: Differences in value-added products manufacturing with the increasing of forest-village distance



Source: Based on field survey including interviews and group discussions with forest dwellers, participatory appraisal and participation and direct observation

The establishment of micro level or cottage industries could be important in helping forest dwellers to improve their socio-economic condition, but there are several problems which hinder the exploration of marketing systems for NTFP based value-added products. These include initial investment problems, constant market demand, storage limitations, lack of modern technical knowledge, poor transportation system and illiteracy (Tewari and Campbell, 1995).

> "… small scale enterprises also face some common constraints, including limited access to institutional finance and a lack of tax incentives, highly risky market environments and income-sharing problems. Moreover, as NTFP markets expand and efforts are made to increase local processing capacity in order to capture the value-added benefits, traditional patterns of management, income distribution and the division of labour can become disrupted." (FAO, 1991a and 1991b in Tewari and Campbell, 1995, p. 56)

With these problems in mind, it is important to find solutions that can enhance the marketing opportunities of these value-added products.

7.4 Conclusion

Forest livelihoods and forests are intimately related. For the proper protection of forest resources, it is necessary to think hard about the forest dwellers' socio-economic lifestyle and livelihoods. Without having a thorough understanding of forest livelihoods, it is quite impossible to protect forest quality in this region. However, forest dwellers can be allowed to collect NTFPs in quantities that will not affect the resource base of the local forest. The value-added products can provide forest dwellers extra money compared to raw NTFPs and thus the collection of NTFPs can also be minimised (Staff members, NAEB, Jadavpur University, Kolkata, group discussion, 17th September 2008).

> "…their [forest dwellers] activities based on forest should be reduced. It should be diverted towards other directions such as through the creation of small and micro types of forest-products based industries, agricultural activities, fisheries, dairy, farming etc. … We must provide [them] an alternative way which should be sustainable and comparatively lucrative way of earning." (Director, NAEB, Jadavpur University, Kolkata, elite interview, 19th September 2008)

At the same time, the Director of the NAEB, Jadavpur University, Kolkata (elite interview, 19th September 2008), suggested that it is not possible to sever forest dwellers' dependence on forest products (because they use these products for their socio-cultural purposes), but feels that the collection for commercial purposes should be more organised and sustainable. Sustainability criteria for NTFP extraction need to be researched and clarified to avoid future forest degradation. Once it becomes clear how much and which product the local forest people can collect from a particular area per annum for commercial purposes, then they can collect that much of product without destroying the resource base.

Forest people have been living in or around the forest for many years, but the population has increased in the study area. However, many of them are not highly dependent on forest product collection and, at present, they are finding different kinds of occupations in different places. The use of NTFPs for medicinal purposes is also diminishing with the increasing uses of modern medical facilities. Even remote villagers can access contemporary medical facilities through the Block or Panchayat level medical centres. The State Government has already introduced mobile health services in this area, where the setting up of permanent medical centres is difficult due to geo-physical reasons (Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region, elite interview, 21st October 2008).

It is likely, however, that as forest people broaden their livelihood portfolios, certain aspects of aboriginal forest based culture are likely to be lost. In order to protect forests and forest culture, it is necessary to identify and promote the regeneration of those plants which provide different types of NTFPs, as well as those species which are used primarily for their timber. This will help forest people to maintain their indigenous culture through the harvesting of NTFPs without destroying the resource base. India is a developing country where millions of people are still living at the forest fringe areas and depend on forest products for their livelihoods. The conservation of both forests and forest-based culture coupled with the scientific harvesting of NTFPs is thus an attractive opportunity for resource poor forest-dependent villagers (Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region, elite interview, 21st October 2008).

> "NTFPs are getting more and more importance as it is being increasingly realised that their management can help in providing more employment and income generating opportunities to the rural poor tribal and forest dependent communities and thus alleviate their poverty if organised scientifically on a sustainable basis. There is immense potentiality of NTFP in various FPC areas of South West Bengal." (Das, 1997, p. 141)

On the one hand, the systematic harvesting of NTFPs will increase employment opportunities among forest dwellers. At the same time, it will also reduce their over dependence on timber products. Thus, problems of forest degradation in this region can be addressed by maintaining forests and supporting local forest culture (PCCF, Government of West Bengal, elite interview, 20th October 2008).

Tribal forest communities use NTFPs for several socio-cultural purposes. However, if the forest cover decreases, due to the disorganized harvesting of forest products, then the type and quality of NTFPs available in the local forests will be affected too. Forest dwellers will not be able to use those NTFPs which they normally use for their socio-cultural purposes. They will draw on some industrial products as alternatives. The new generations will not come to know about the uses and importance of those forest products. Therefore, the unique socio-cultural identity of these tribal forest communities will be lost and the use value of the forest products will remain unknown to the outside world. The study of forest communities' socio-cultural life can help to protect NTFP species and the dry-deciduous forest cover of the State.

Chapter 8

The status of collection and storage of NTFPs

8.1 Introduction

The collection and storage of NTFPs in a systematic and scientific way is an important part of the overall NTFP harvesting system to control the overexploitation. In order to minimize the destruction of the forest resource base and promote the socio-economic enhancement of marginal forest dwellers, the collection and storage of NTFPs needs to be done in a sustainable manner. To protect forest areas, the West Bengal Forest Department has implemented some rules and regulations. In wildlife sanctuaries and national parks, nobody is allowed to collect any sort of NTFPs. According to PCCF, Government of West Bengal (elite interview, 20th October 2008), "following the JFM resolution of 1991 (resolution number 8554 - For Dated 15.11.1991) FPC members, particularly tribal communities, can collect some NTFPs from reserved forest for their daily household needs, but the Forest Department can place restrictions at any circumstance. Forest dwellers are normally allowed to collect NTFPs for domestic as well as commercial purpose from protected and unclassed state forests unless the threat of extinction of any plant or animal species".

A few initiatives from the State Forest Department have already been taken to systematise NTFP harvesting in different types of forests. However, in most cases, forest fringe dwellers do not follow these initiatives. According to the Managing Director of West Bengal Forest Development Corporation (WBFDC), "…Joint Forest Management (JFM) committee members, eco-development committee members, FPC members already have rights from the West Bengal state Forest Department to collect NTFPs even from reserved forests and the buffer areas of sanctuaries and national parks. Therefore, in terms of NTFP collection, there is no difference between reserved forest, protected forests and unclassed state forests at present" (elite interview, 24th October 2008).

He also added that most of the forests in North Bengal are reserved forest and sanctuaries. A number of forest communities have been living within these forests for a long time and they collect NTFPs on a regular basis for their domestic needs as well as for sale. On the other hand, in South Bengal, most of the forests are of protected or unclassed type and the highest levels of NTFP collection take place in these forests (Fig. 8.1). For this reason, this chapter will emphasise the importance of the systematic collection and storage of NTFPs in these dry-deciduous forests.

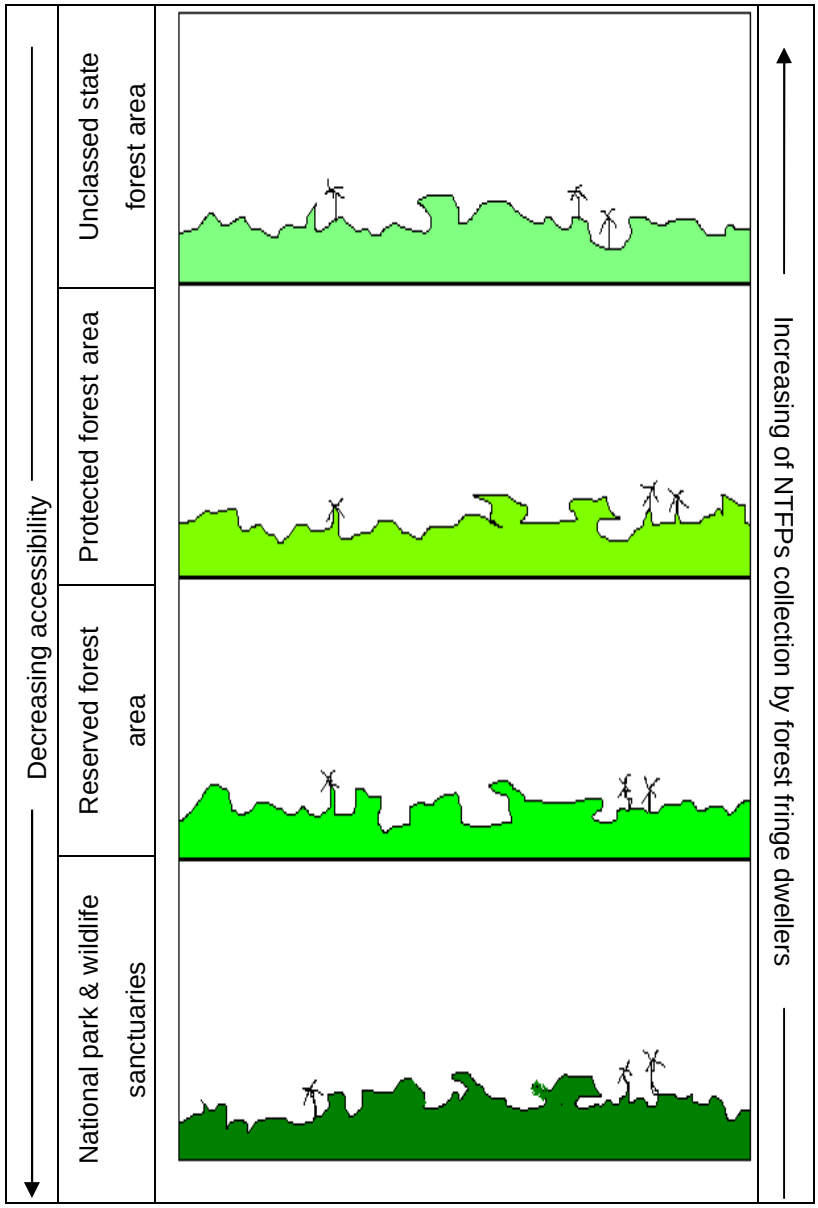


Fig. 8.1: With the increasing of protection the accessibility for the collection of forest products by forest dwellers decrease

Source: Ghosal, 2009

According to the Deputy Director in Charge of the Regional Office of the Forest Survey of India, Eastern Region (elite interview, 21st October 2008), the sustainable collection of NTFPs could help to improve the socio-economic status of forest dwellers as well as forest quality. He thinks that NTFP extraction should not go beyond exhaustion at any stage. For example, in Purulia district, most of the forests are protected forest. As forest people can collect NTFPs from such forests without having any prior permission from the Forest

Department, the continued exploitation of firewood (the most widely collected NTFP in the district) will create a tremendous pressure on the existing forest in the near future.

Although scientific and systematic techniques and approaches regarding NTFP collection and storage are important factors for the sustainable harvesting of NTFPs, these factors have not received sufficient attention to date. Very few studies focusing on the collection and storage of NTFPs have been undertaken in West Bengal (Chowdhuri *et al.*, 1992; Negi and Bhalla, 2002). Work like 'Sabai cultivation as a support activity in JFM projects' by the Ramakrishna Mission Lokasiksha Parisad, Narendrapur (1995) is also required for other NTFPs, particularly in the protected forests of South Bengal, where there are few restrictions on NTFP collection and a large number of forest based communities.

8.2 The seasonal status of NTFPs collection by forest dwellers

The variety and quantity of NTFPs differ from one forest type to another (reserved, protected or otherwise) all over West Bengal. The variation is also noticeable with seasonal changes. In general, the greatest numbers of NTFPs are collected in April – June (Graph 8.4) when new leaves emerge. Collection again increases in October – November when different types of flowers, fruits and roots are collected. The main reason behind the seasonal variation in quantity and quality of NTFPs is that the flowering and fruiting season is not same for all plant species. According to the Assistant Managing Director of WBTDCC (semi-structured interview, 16th September 2008),

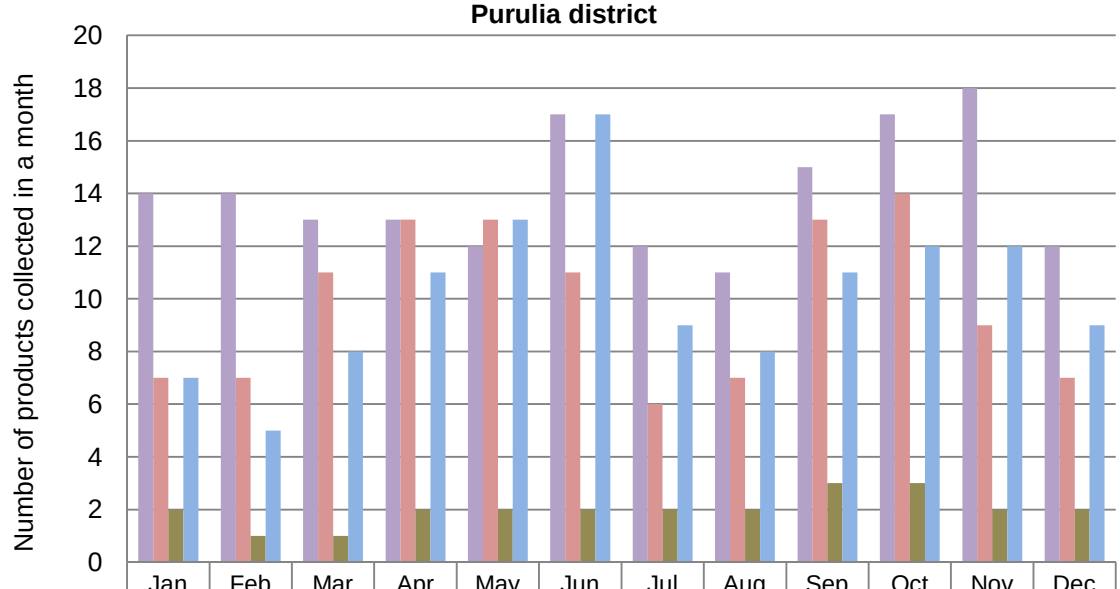
> "Collection of NTFPs differs with the plants species. For example, *Kendu* leaf collection starts in March and it continues till the end of June. But peak season is in April-May. *Sal* seeds are collected in the month of June – July. Other NTFPs such as medicinal plants including Kalmegh are collected in August-September. We always ask forest people to collect NTFPs when fruits will be grown up so that the species survive for future."

Most of the NTFPs collected are highly seasonal and with the reduction of the total geographic area of forest cover, the type and quantity of NTFPs is decreasing. There are some NTFPs which used to be collected for a longer period in the past. However, with the decrease in the number of such plant species, these NTFPs are only available for a few days each year. For example, Bhela (*Semecarpus anacardium*), a very popular fruit, was abundant in the forests of Purulia and Bankura in the past. Forest villagers used to collect a good amount of Bhela each year, but now there are very few Bhela trees in the local forest so the amount and period of availability have reduced.

Only some types of NTFPs, such as roots and barks, are available throughout the year. However, most seeds, leaves and fruits are collected seasonally. Sal leaves are collected throughout the year, except February – March when the new leaves come out. Kendu leaves, another important NTFP in these three Districts, is collected during April – June (Appendix 3). To organise the systematic and scientific collection and storage of NTFPs, it might be useful for the Forest Department to have an NTFP based calendar, which gives a clear picture of the period of availability of every NTFP. Following that, a map based on the availability of NTFPs needs to be produced which will help the Forest Department to formulate plans regarding the location of storage and marketing centres in these three Districts. The Conservator of Forest, Working Plan & GIS, Department of Forest (semi-structured interview, 16th September 2008) thinks, "…first we have to identify species rich areas. Then we have to create a map based on the available species and following the NTFPs based calendar, species collection should be done by the local FPC members".

Collection of NTFPs also varies with the seasonal occupation of forest dwellers (Malhotra *et al.*, 1992). During the monsoon and late autumn, many tribal forest villagers work as agricultural wage labourers. They even go to neighbouring districts for two or three months. During this time, only those family members, who live in the village go to the forest for the collection of fodder, firewood and some other NTFPs. However, during these two seasons, the total amount of NTFPs collected falls considerably.

Graph 8.1: Number of NTFPs collected per month in Arsha range of Purulia district

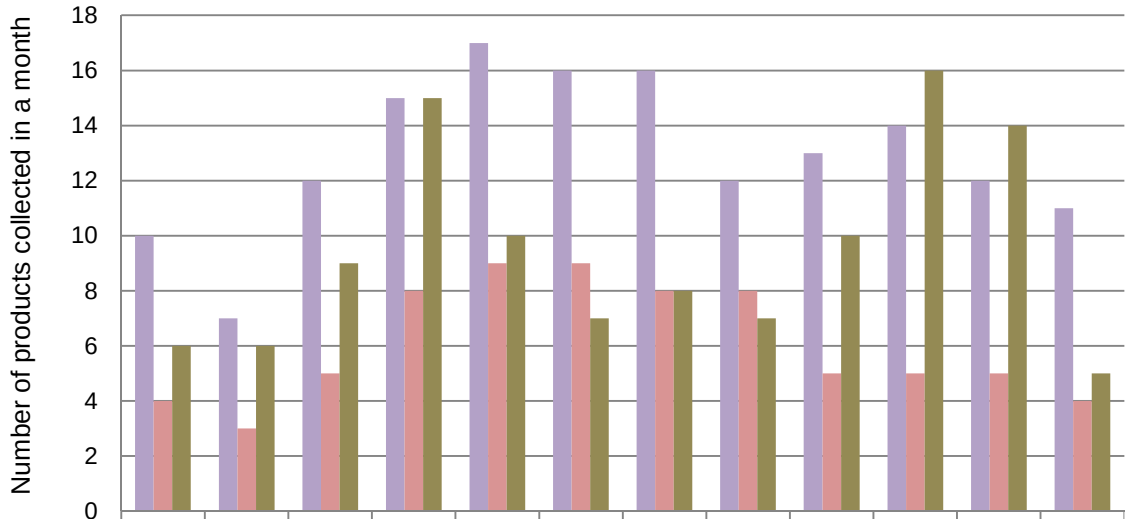


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bhuda	14	14	13	13	12	17	12	11	15	17	18	12
Sirkabad	7	7	11	13	13	11	6	7	13	14	9	7
Kalaboni	2	1	1	2	2	2	2	2	3	3	2	2
Gurahata	7	5	8	11	13	17	9	8	11	12	12	9

Source of data: Based on questionnaire survey

Graph 8.1 shows that the collection of NTFPs increases in April – June and again in October – November in Purulia district. In general, the monsoon starts in India from mid June (the official arrival date of monsoon in the southern coast of India is 7th June) so agricultural activities usually start in West Bengal in the month of July. As Purulia, Bankura and West Midnapur districts are drought prone and irrigation is limited, local villagers are highly dependent on the monsoon rainfall for farming.

Graph 8.2: Number of NTFPs collected per month in Ranibandh range of Bankura district



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Jamdaha	10	7	12	15	17	16	16	12	13	14	12	11
Barudi	4	3	5	8	9	9	8	8	5	5	5	4
Katiam	6	6	9	15	10	7	8	7	10	16	14	5

Source of data: Based on questionnaire survey

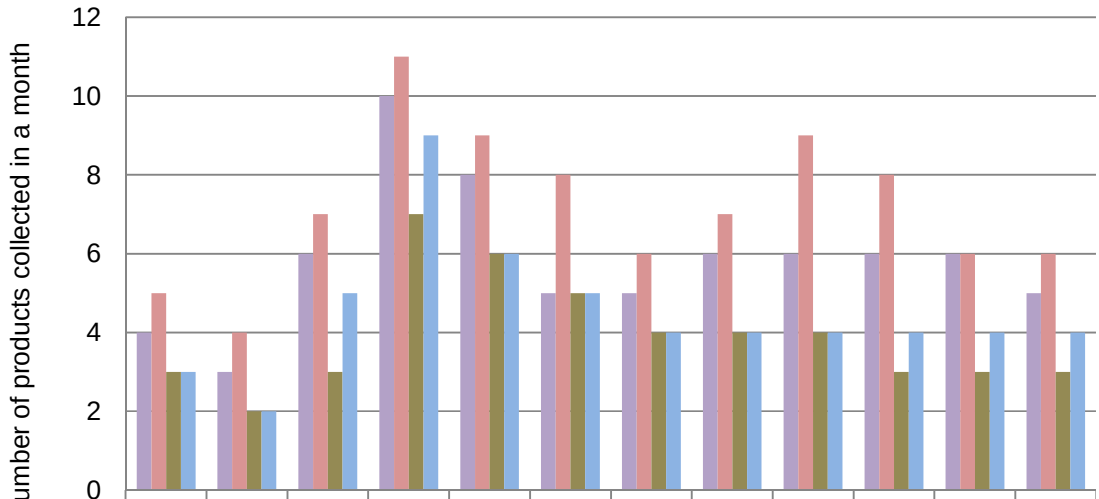
The forest people of these three districts also go to neighbouring districts for agricultural wage labouring jobs. During September – November, when forest dwellers return to their home the collection of NTFPs again increases (Graph 8.2 and 8.3). In November – December, when they migrate to other parts of West Bengal for winter crop harvesting, the collection of NTFPs falls once again. In December – January, most plant species drop their leaves and because of the absence of flowers or fruit, NTFPs collection is again reduced as only a few types of roots are collected during this time. In February – March, the new leaves appear and flowers and fruits come out in the months of April – May so this is the peak season of NTFP collection. Another reason for the increase of NTFP collection during these months is the lack of wage labouring jobs elsewhere.

The collection of NTFPs also varies depending on the distance from the forest and forest villages. People who live in the interior forest area, quite far from local markets, collect

different types of NTFPs for several household purposes. People who live at the forest fringe, near the local market, by contrast, tend to collect those NTFPs which have a good market value. Therefore, with distance from the forest, the purpose of NTFP collection and the type of NTFPs collected also varies.

The collection of NTFPs also varies with the geo-physical environment. In the uplands of Purulia and Bankura districts, where miscellaneous forest is greater in extent, the type and quantity of collected NTFPs is better compared to the Sal dominated forests in the plains of West Midnapur district.

Graph 8.3: Number of NTFPs collected per month in Jamboni range of West Midnapur district



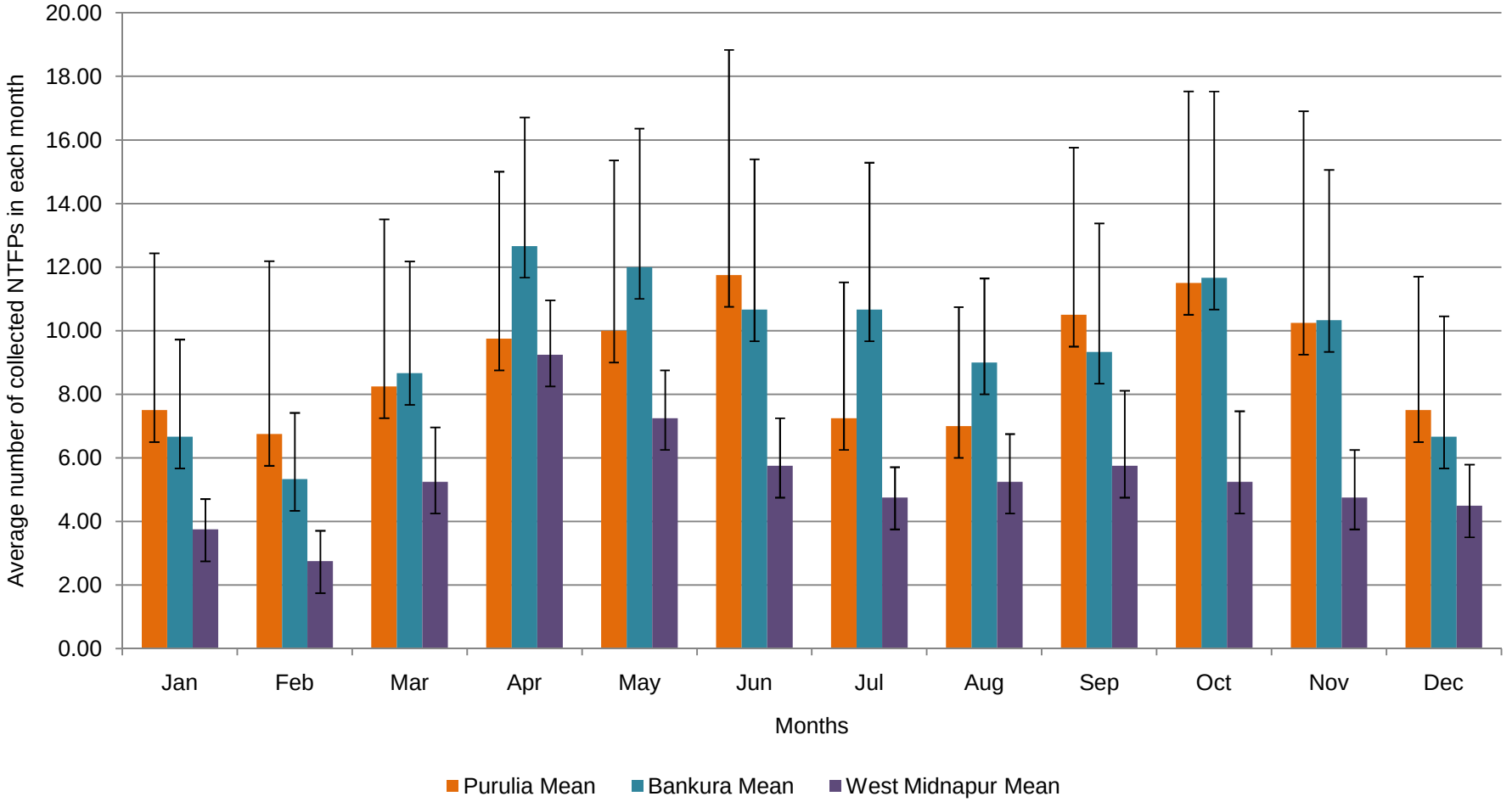
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dakshinsol	4	3	6	10	8	5	5	6	6	6	6	5
Harinaganj	5	4	7	11	9	8	6	7	9	8	6	6
Kendua	3	2	3	7	6	5	4	4	4	3	3	3
Shushni	3	2	5	9	6	5	4	4	4	4	4	4

Source of data: Based on questionnaire survey

Graph 8.3 shows that in the month of April, the number of collected NTFPs in West Midnapur district (at the Harinaganj village) is at a maximum, whereas, it is lowest in February. The total number of collected NTFPs in West Midnapur district is always lower than in Purulia and Bankura districts. This is because the forest features of West Midnapur district differs significantly from those of Purulia and Bankura districts.

Graph 8.4 shows how the collection of NTFPs in Purulia and Bankura districts varies considerably in different seasons. Whereas in West Midnapur district, fewer NTFP are collected so the seasonal variation in the number of NTFPs collection is also less there.

Graph 8.4: Average number of monthly collection of NTFPs in Purulia, Bankura and West Midnapur districts with standard deviation



Source of data: Based on questionnaire survey

8.3 Collection of NTFPs by Government organisations

The collection of NTFPs is carried out in two different ways in West Bengal – these are a) government authorised organisations and b) informal channels controlled by middlemen and mobile agents. The two main government organisations controlling the harvesting of NTFPs in the districts of Purulia, Bankura and West Midnapur are WBTDCC authorised LAMPS and WBFDC. The WBTDCC collects Kendu leaves, Sal seeds and sometimes Babui grass in all three Districts. The WBFDC collects cashew nut in West Midnapur district only. The state Forest Department is not involved in the collection of forest products directly. According to the APCCF, Department of Forest, Government of West Bengal (elite interview, 23rd October 2008, Fig. 8.2), "we have Forest Development Corporation (FDC), which is mostly involved in timber and firewood related harvesting. For minor forest produces, however, since the monopoly right is with WBTDCC and following the JFM resolution (resolution number 8554 - For Dated 15.11.1991) tribal people are also permitted to collect it free of cost so the Forest Department has no plan to involve in it".

Fig. 8.2: Semi-structured interviews with the APCCF (left), Department of Forest, Government of West Bengal (23-10-2008) and Faculty member of the Forest Training Centre, Jhargram, West Midnapur district (15-12-2008)

Faculty members of the Forest Training Centre of Jhargram, West Midnapur (Fig. 8.2) think that the Forest Department must be cautious regarding the collection of forest products including NTFPs. The Forest Department has given authority to FPC members to collect NTFPs for their household needs and for sale at the local market without the need to pay any royalty or revenue to the State Government. In most cases, however, forest villagers normally collect NTFPs according to their livelihood and income requirements and have not developed a systematic or sustainable method of NTFP collection that seeks to protect biodiversity or future NTFP availability. Ultimately, the lack of a systematic strategy for NTFP

collection creates problems in terms of safeguarding the resource base. Therefore, there is an urgent need to involve the Forest Department to assist FPC members to develop more sustainable methods of NTFPs collection (Staff member, Forest Training Centre (FTC), Jhargram, West Midnapur, semi-structured interview, 15th December 2008).

To promote such activities, the JFM Wing of Ramakrishna Mission Lokasiksha Parishad, Narendrapur, Kolkata has made a recent move to promote the systematic harvesting of NTFPs amongst the FPC members.

> "*According to the capacity of Ramakrishna Mission Lokasiksha Parishad, State Forest Dept has given permission of NTFPs collection. At present we have very limited infrastructure, man-power, contact with forest people as well as industrial units, financial support and storage facilities and with this limited infrastructure we cannot collect more than this*." (JFM Wing, Ramakrishna Mission Lokasiksha Parishad, Ramakrishna Mission Ashrama, Narendrapur, Kolkata, group discussion – 16th September 2008, the medium of discussion were Bengali and English)

The organisation has three 'cluster organisations' for the systematic harvesting and marketing of NTFPs in Purulia and Bankura districts. These are: (1) Ma Sarada Palli Seva Samity at Mathgoda, Bankura, (2) Vivekananda Seva Samity at Santuri, Purulia and (3) Ramakrishna Seva Samity at Ajodhya, Purulia (JFM Wing of Ramakrishna Mission Lokasiksha Parishad, Narendrapur, 2008).

The other important government organisation is NAEB, which is working to promote the sustainable exploitation of NTFPs and the socio-economic improvement of forest dwellers living in Purulia, Bankura and West Midnapur districts. According to NAEB staff (group discussion, 17th September 2008), "we are organising workshops to teach JFM members about the systematic collection and storage of NTFPs and how they can sell their collected products in an organised way, so that they can earn enough money to solve their present socio-economic problems. We are trying to do some evolutionary work - evolution of forest livelihoods through the proper uses of forest resources".

Government organisations are trying to work as a link between actual collectors and major industrial units. In order to harvest NTFPs in a more organised way, the State Forest Department has already taken some initiatives. They are trying to map forest products to inform the industrial units about the NTFPs available in different areas, the main production periods and the potential amount available in a year. If the industrial units know where they can obtain sufficient supply of particular NTFP, they are more likely to be interested in

harvesting that particular product. Otherwise, the cost of collection will be too high for them and they will lose their interest.

> "…once you are producing in bulk and quality material then some of the major consumers will get interest … because now they are assured that every time, without roaming around a big area, they can get enough product. … Even you know these big consumers of medicinal plants (such as Dubar, Emami etc) now willing to sponsor this plantation. For this plantation, Forest Department and Forest Development Corporation can also give money and even many schemes are there for plantation and systematic harvesting. … One such plantation is going to be done of Jatropha." (Managing Director, WBFDC, elite interview, 24th October 2008)

However, contradicting the view of the Managing Director of the Forest Development Corporation, the APCCF alleged that industrial units normally do not like to contact the Forest Department regarding NTFP collection because, "… if they collect through Forest Department then they [Industrial units] may have to pay more, the reasonable price … so they are not interested to come to us. … Unfortunately these people (actual collectors), in most cases, do not know the actual market price of their collected products. And for a small amount of money they become interested in collection and they supply their collected products to the industrial units directly or through middlemen and mobile agents" (APCCF, Government of West Bengal, elite interview, 23rd October 2008).

Many educated unemployed people in these three Districts and even from the neighbouring States are becoming interested in the NTFP business and are applying to the Divisional Forest Officer of the concerned Division for permission to collect NTFPs (Fig. 8.3, 8.4 and 8.5). Most of these people are asked to contact with Range Officer and Beat Officer from where they will be collecting the product. Range officers and Beat officers introduce these people to FPC members. Then FPC members collect the product for the applicants. The applicant cannot collect more than the amount allotted by the Divisional Forest Officer. Thus, through this system, Forest Department gets an idea about the total amount of each product collected from a particular forest area and they also receive a certain amount of revenue. On the other hand, forest dwellers also get an appropriate price for their collection. The collection of some types of bark, sabai grass and medicinal herbs have already got priority in this system. Similar initiatives are needed for several other NTFPs.

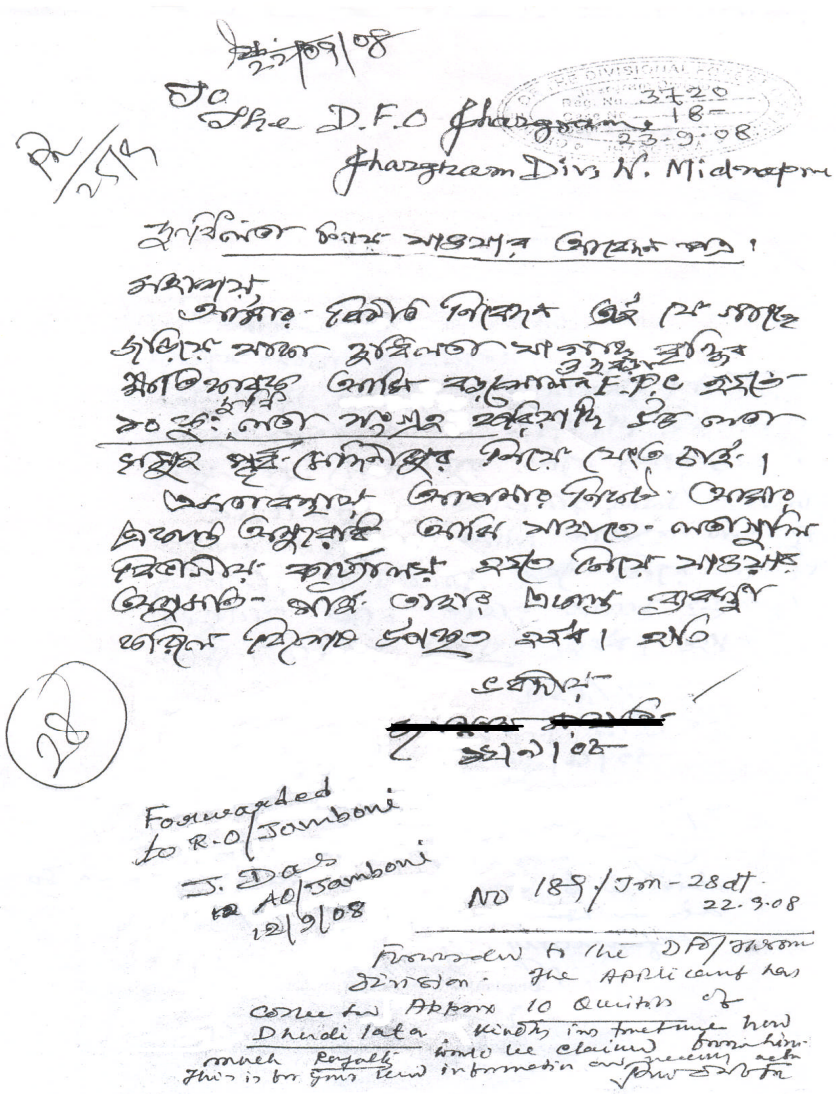


Fig. 8.3: Application for the collection of lianas

Source: Divisional Forest Office, Purulia Division, Purulia

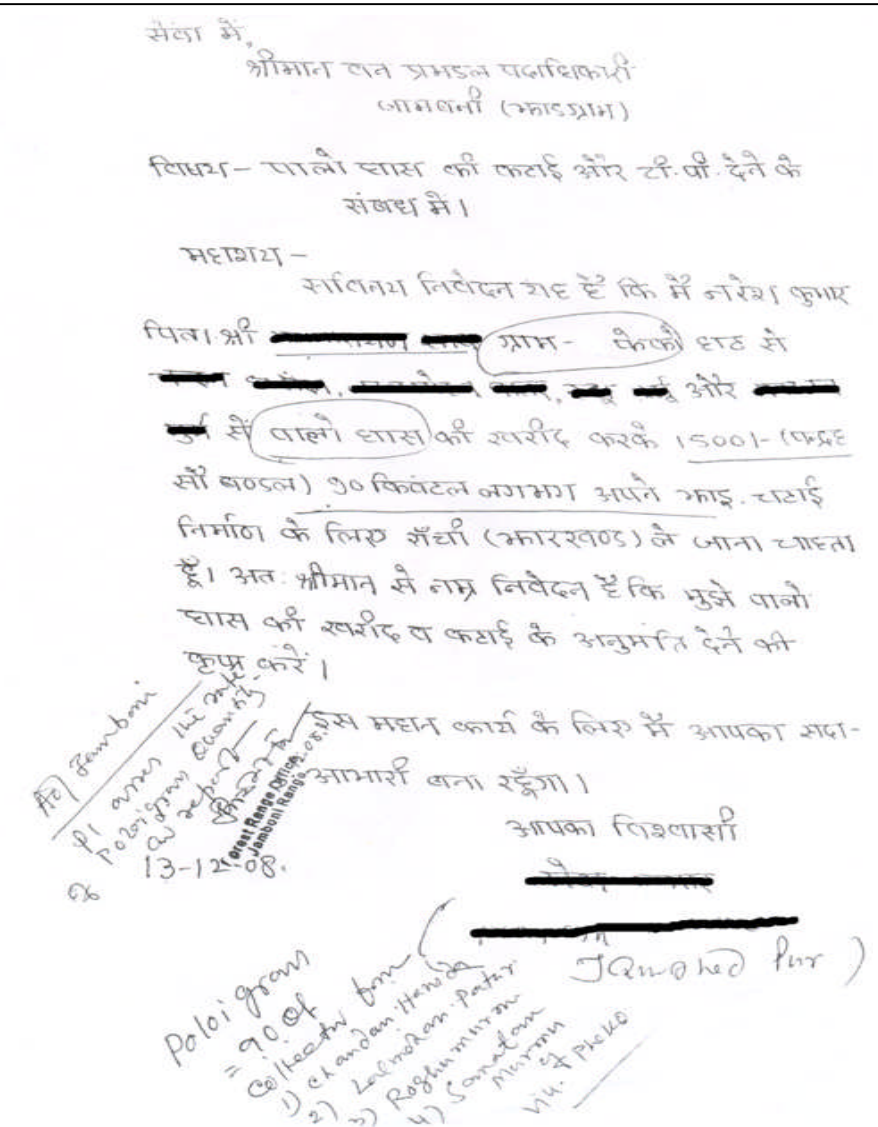
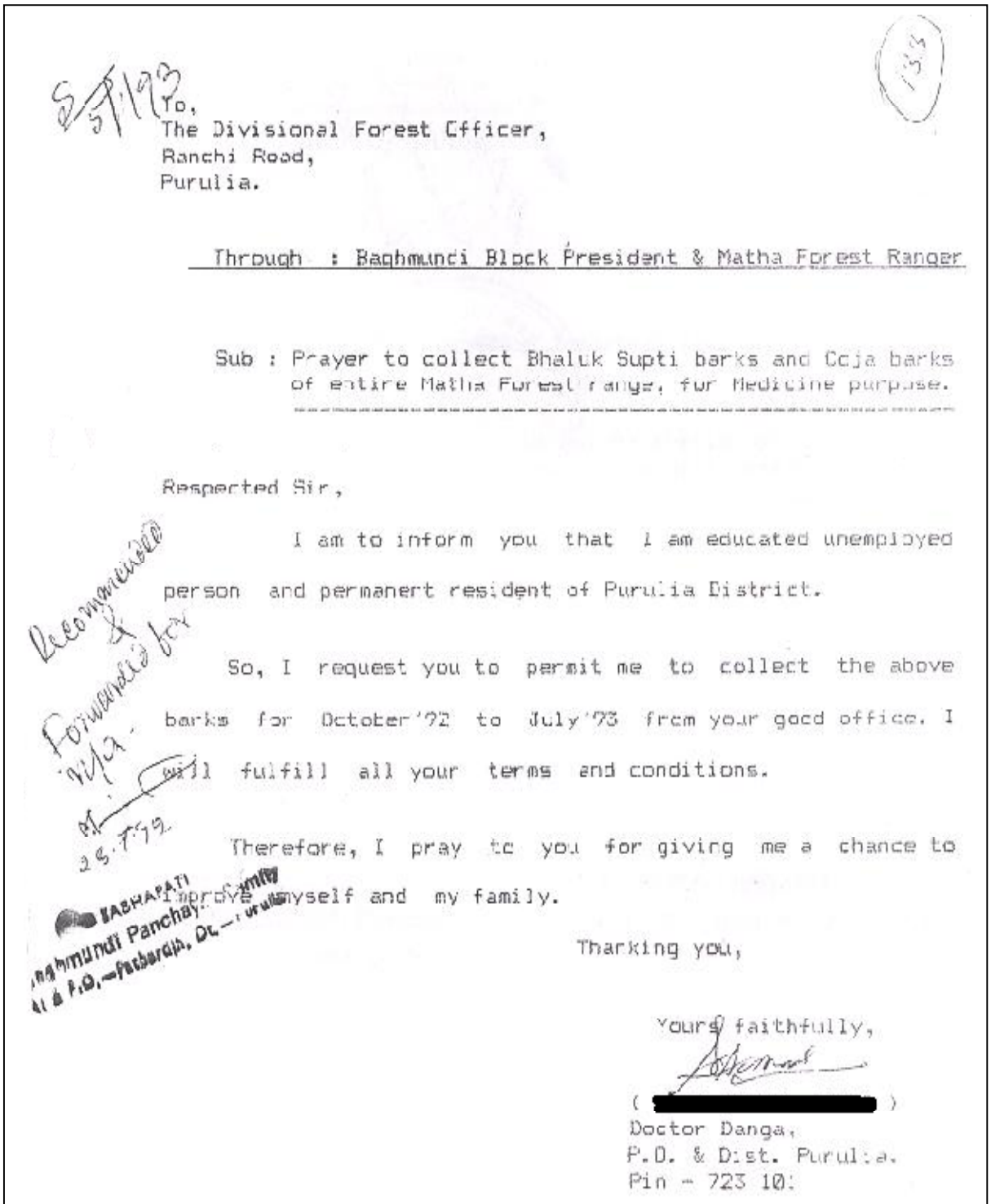


Fig. 8.4: Application for the collection of Sabai grass

Source: Divisional Forest Office, Purulia Division, Purulia



5/7/'73

To,
The Divisional Forest Officer,
Ranchi Road,
Purulia.

Through : Baghmundi Block President & Matha Forest Ranger

Sub : Prayer to collect Bhaluk Supti barks and Ccja barks of entire Matha Forest range, for Medicine purpose.

Respected Sir,

I am to inform you that I am educated unemployed person and permanert resident of Purulia District.

So, I request you to permit me to collect the above barks for October'72 to July'73 from your good office. I will fulfill all your terms and conditions.

Therefore, I pray to you for giving me a chance to improve myself and my family.

Thanking you,

Yours faithfully,

([redacted])
Doctor Danga,
P.O. & Dist. Purulia.
Pin - 723 10:

Recommended & Forwarded for
25.7.73.
BASHAPATI
Baghmundi Panchay

Fig. 8.5: Application for the collection of bark

Source: Divisional Forest Office, Purulia division, Purulia district

8.4 Collection of NTFPs by informal channels

In West Bengal, informal channels for NTFP harvesting are stronger than formal channels (Ramakrishna Mission Lokasiksha Parisad, 2004). The collection of NTFPs in the districts of Purulia, Bankura and West Midnapur is carried out mainly by forest dwellers. They collect NTFPs either for their daily household needs or to sell. They sell some NTFPs at the local market directly to the consumer, while others are sold to mobile agents and middlemen. Mobile agents or middlemen sometimes also visit forest villages to collect NTFPs, especially Sal plates. This form of NTFP collection is not subject to any restriction or regulation. Actual collectors are usually paid very low prices for their collected products, so villagers try to collect as much as possible, ignoring potential losses to future production. The collection period, technique of collection and official restrictions regarding the amount of collection are often overlooked in this case.

> "... [In informal marketing channels] sometimes NTFPs are collected in destructive way. … If you collect plants to such an extent that regeneration is affected then it is going to really make the plant either not available in sufficient quantity or even become extinct in near future." (APCCF, Govt of West Bengal, elite interview, 23rd October 2008)

Fig. 8.6: Tribal women collect dead trees, leaves and branches in regular basis for fuel in Purulia, Bankura and West Midnapur districts

Photo: Ghosal, S.

In Purulia, Bankura and West Midnapur districts, firewood is the main source of fuel for domestic needs. The one and only source of firewood is the local forests. People collect firewood for domestic as well as for commercial purposes. As there is a high level of demand for firewood at the local market, resource poor forest fringe dwellers collect firewood on a regular basis (Fig. 8.6) and the total amount of firewood collection is increasing rapidly to meet demand. Forest dwellers often ignore the Forest Department's rules and regulations

regarding the collection of firewood. They sometimes even collect green trees for this purpose.

The problem is the same regarding the collection of other NTFPs in the informal channels. For example, the demand for Kalmegh is higher in the months of August – September as the new leaves come out during this period. However, this is not the appropriate time for Kalmegh collection because the flowers sprout in October. If forest dwellers collect the whole plant in August-September (to save time and to earn some extra money), which has an impact on the ability of this species to regenerate (Fig. 8.7). The same is true for the collection of Bel and Lodh bark. The Managing Director of the WBFDC remarked (elite interview, 24th October 2008):

> "We should not do collection of species when they are in flowering stage. We should avoid flowering stage. The second thing is – how we are collecting. Sometimes the collection can be a small part of the plant, without damaging the whole plant. Now what they [actual collectors] do they remove whole plant and they took to their house and then they sort out the useful part and rests. It may be easy for them but when they are collecting in the forest they can take only the valuable part of the plants and leave the rests in the forest or leave the part from where it can be regenerated. However, people often go for the short cut (Fig. 8.7)…"

Fig. 8.7: Kalmegh (*Andrographis paniculata)* and *Bel* (*Aegle marmelos*) are two important NTFPs collected by forest dwellers from the native forests of Purulia and Bankura districts
Photo: Ghosal, S.

According to the ADFO of Jhargram Division in West Midnapur district (semi-structured interview, 27th November 2008), when forest villagers go to the forest for the collection of forest products, they try to collect as much as they can. This is because they know very little

about how much many NTFPs are worth and so they collect as much as they can to try to ensure a decent income for their day's work (Fig. 8.8).

Fig. 8.8: Tribal women and children collect Sal leaves and flowers (right) from the native forest for domestic as well as commercial purposes

Photo: Ghosal, S. and the Department of Forest, Government of West Bengal

To explain the impact of NTFP collection by forest dwellers, the Additional Divisional Forest Officer (ADFO) of Jhargram Division, West Midnapur district gave an appropriate illustration. According to him (semi-structured interview, 27th November 2008),

> "There is the State Highway 9, which is now [December, 2008] blocked because of the Maoist movements. If you go through this Highway there is lots of ground vegetation [NTFPs], which is produced during monsoon.... When forest people collect these NTFPs they collect in destructive manner. Suppose root is important, instead of collecting branch roots, they uproot the whole plant with main root. Now soil become loosens. Thus, now if you go through this road you will see the soil erosion and because of that, big gullies are formed. You will see gullies more prominently in the dry season. During monsoon, however, when the ground vegetation come up, the gullies are become filled up by soil. … Thus the ecosystem of the area is getting disturbed. Therefore, the necessity of systematic collection of ground vegetation to conserve ecosystem become clear."

However, forest fringe dwellers are often forced to 'background' (Douglas, 1995) risks surrounding soil erosion and related environmental hazards as more immediate risks relating to food insecurity are 'foregrounded'. According to villagers, "we collect roots, leaves and other forest products when we need money. If we do not get any other job then compel to collect forest products, whatever we get from the local forest. If we collect roots and other

products along the roadside then it will be easier to carry to the town market" (Kendua villagers, Jamboni range, West Midnapur district, group discussion, 14-12-2008).

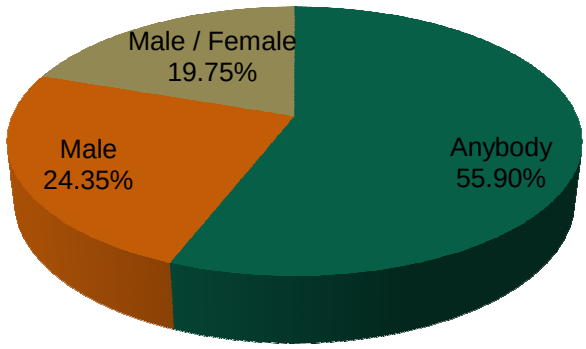
In Purulia and Bankura districts, mobile agents ask forest dwellers to collect certain tree barks which are used as industrial raw material as well as for medicinal purposes. It is because of the excessive and unnecessary debarking activities, these species have almost disappeared. As a result, the Forest Department has completely banned the debarking of some species through an executive order and which states that if bark from these species are collected then scientific procedures must be followed. According to the Forest Department's instructions, the bark can be collected from one side of the plant in one year and from the other side in the next year. Thus, the biological activities of the plant will not be affected. In many cases, however, the actual collectors are not aware of these restrictions and continue to collect bark whenever middlemen ask them. To control the destruction associated with such forms of NTFP collection, the NAEB, Jadavpur University, Kolkata (group discussion, 17th September 2008) is thinking about supporting community enterprise systems in which one group of people will collect NTFPs, another group will process them and others will be involved in marketing of the product.

Another problem regarding the collection of NTFPs is the collection of fodder. According to staff members of the Arsha Forest Range Office of Purulia district (group discussion, 24th September 2008, medium of conversation was Bengali), "a*part from the collection of firewood, another problem is the collection of fodder from forest area. Everyday forest fringe people keep their cattle in the forest area to feed them. Thus lots of plant species [especially shrubs, ground vegetation] as well as NTFPs are destroying each year".*

8.5 Gender division and the collection of NTFPs

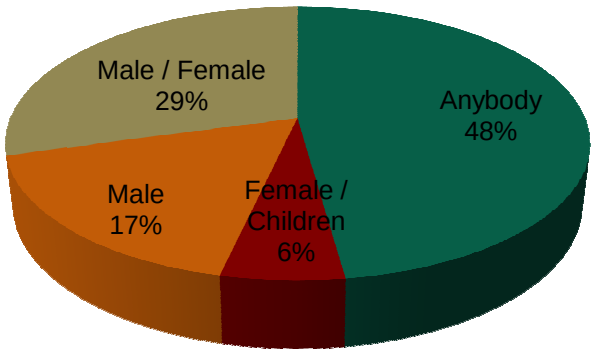
The following figures show the percentage of family members that collect different types of NTFPs in Purulia, Bankura and West Midnapur districts. In Purulia district (Graph 8.5), over 55 per cent of NTFPs are collected by all family members. The collection of these NTFPs are made by male, female as well as child members. Therefore, the number of people entering the forest for the collection of forest products is higher in Purulia district compared to Bankura (Graph 8.6) and West Midnapur (Graph 8.7) districts. The number of NTFPs which are collected by male family members only is also higher in Purulia district (24%) followed by Bankura (17%) and West Midnapur (16%) districts. In West Midnapur district, the forests are mainly Sal dominated and the main NTFP of the District is Sal leaves, which is collected by female and child members. The proportion of NTFPs collected by women and children is higher (9%) in West Midnapur district than in Purulia and Bankura districts.

Graph 8.5: Percentage of family members collect different types of NTFPs in Arsha range of Purulia district



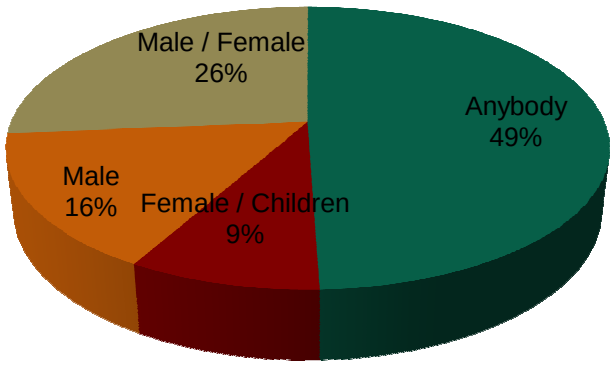
Source of data: Based on questionnaire survey

Graph 8.6: Percentage of family members collect different types of NTFPs in Ranibandh range of Bankura district



Source of data: Based on questionnaire survey

Graph 8.7: Percentage of family members collect different types of NTFPs in Jamboni range of West Midnapur district



Source of data: Based on questionnaire survey

8.6 Variability in the collection of NTFPs for household and commercial purposes

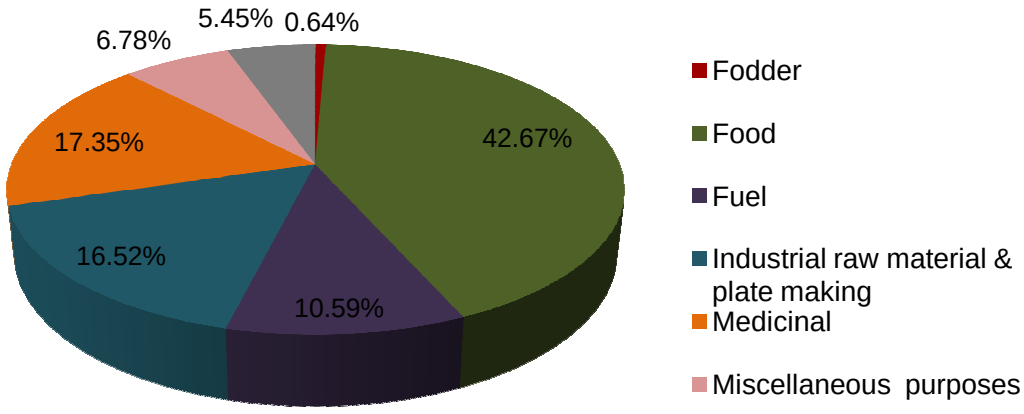
The variability in the purpose of NTFP collection is quite noticeable in these three Districts. The purpose of collection varies based on the availability of the product, location of the market and local as well as external demand. If a product is available and has a good market demand, then forest dwellers normally prefer to sell the product for money. There are some NTFPs (such as eucalyptus leaves in West Midnapur district) which are available in the local forest. However, they do not have a market so forest people are not interested in collecting these products.

In general, when forest dwellers collect any NTFP for commercial purpose, they try to collect as much as possible, so ecologically destructive forms of collection are more common in that case. This is particularly common when the market demand is relatively high and middlemen or mobile agents pay in advance for the product. That is why the collection of NTFPs for commercial purposes, particularly in informal marketing channels, should be more organised and restricted.

On the other hand, when forest dwellers collect NTFPs for their household needs, they only collect as much as they need because they do not have much storage place in their houses and most of NTFPs cannot be stored for long without rotting. Therefore, the collection of NTFPs for domestic use is not as harmful to the forest ecology as commercial collection. The Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region (elite interview, 21st October 2008) thinks, "...for the ecological sustainability of this fragile ecosystem, this type of lopsided commercial exploitation should be banned. Thus, the collection of NTFPs for informal commercial exploitation, controlled by middlemen, is not welcome, in fact, it should be banned".

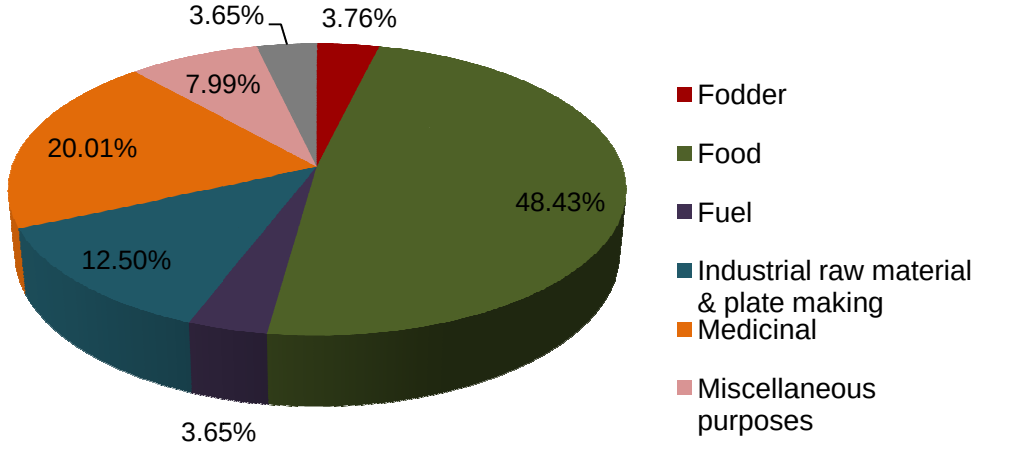
Graphs 8.8, 8.9 and 8.10 display the percentage of collected NTFPs used for several purposes. In all three Districts, the greatest number of NTFP types are used as food, followed by medicinal use and use as industrial raw materials. As the number and types of NTFPs are greater in Purulia and Bankura districts than West Midnapur district, many NTFPs are collected for miscellaneous purposes in these two Districts. The purpose of collection is often for household needs as well as commercial purpose in Purulia and Bankura districts. In West Midnapur district, however, the percentage of NTFPs collected for commercial purpose (25.96%) is higher than other two Districts. In West Midnapur district, most of the NTFPs are collected for sale rather than for household use.

Graph 8.8: Percentage of the total number of NTFPs collected for different purposes in Arsha range of Purulia district



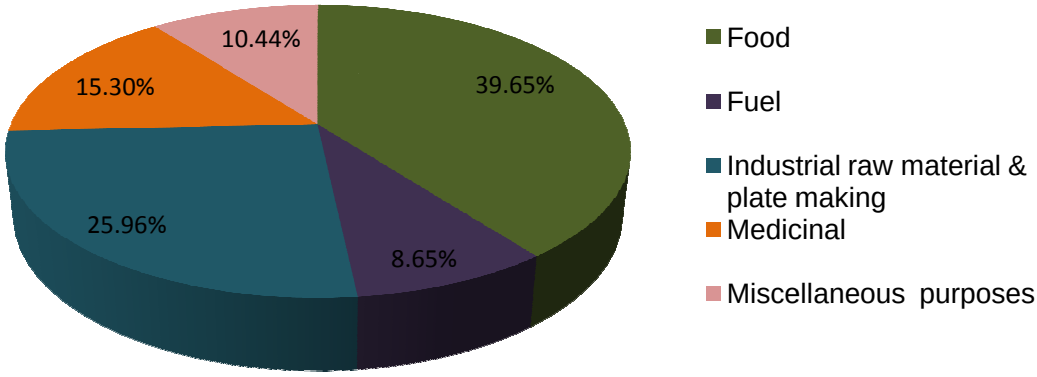
Source of data: Based on questionnaire survey

Graph 8.9: Percentage of the total number of NTFPs collected for different purposes in Ranibandh range of Bankura district



Source of data: Based on questionnaire survey

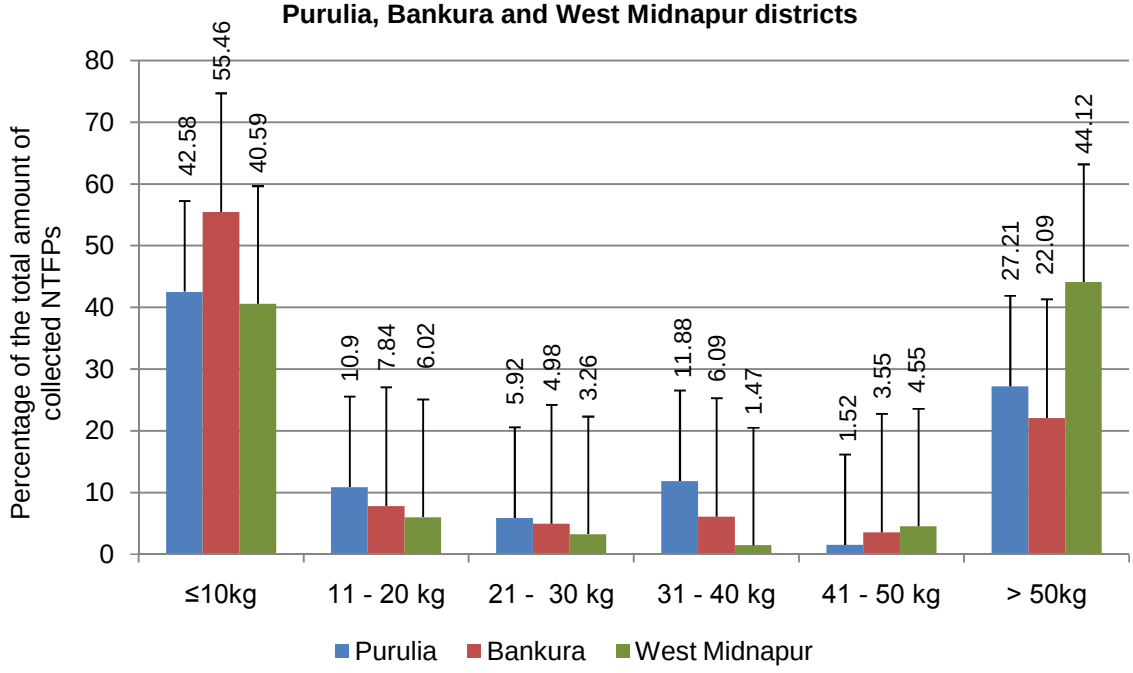
Graph 8.10: Percentage of the total number of NTFPs collected for different purposes in Jamboni range of West Midnapur district



Source of data: Based on questionnaire survey

The products which have a ready market demand are more important to forest dwellers than other NTFPs. Although some products are available in abundance, forest dwellers are not interested in them because of the limited market demand for them. For example, during a group discussion (4th December 2008, medium of conversation was in Bengali) with Harinaganj FPC members, they regretted the lack of marketing opportunities for eucalyptus leaves. "*There are many eucalyptus trees in the local forest and its leaves can be used to produce oil, which has multiple uses including use as an industrial raw material. However, there is no market for such leaves so forest dwellers do not collect them.*"

Graph 8.11: Percentage of the total amount of collected NTFPs in Purulia, Bankura and West Midnapur districts



Source of data: Based on questionnaire survey

Graph 8.11 shows that most NTFPs are collected in quantities of less than 10 kg in an average household in a year. This is true for all three Districts. This shows that the quantity of NTFPs collected is in most cases is quite low. The number of NTFPs collected tends to decrease as the quantity collected increases. Therefore, there is an inverse relationship between the number and quantity of NTFPs (fewer NTFPs are collected in large amounts). Again, there are some NTFPs (such as firewood, fodder, leaves as vegetables, Sal leaves etc) which are collected on a regular basis throughout the year. The total amount collected of these products are more than 50 kg in a year per household.

8.7 Storage of NTFPs by government recognised bodies

After NTFP collection, the most important job is storage. There are two main types of storage – a) government or government authorised NGO-controlled storage centre and b) private storage centre. In the dry-deciduous forest area of the south-western part of West Bengal, government storage centres are only available for Kendu leaves, Sal seeds and small amounts of Sabai grass. These storage centres are managed by LAMPS (Fig. 8.9) under the direction of WBTDCC. The WBFDC has a few timber depots in the State which are also used to store a few NTFPs, such as honey (in Sunderbans) and cashew nut (in West Midnapur). The Ramakrishna Mission Lokasiksha Parishad possesses some other storage centres in Purulia, Bankura and West Midnapur districts, which are also used as marketing outlets for the collected NTFPs. The Ramakrishna Mission Lokasiksha Parishad controlled storage centres are mainly used for medicinal plants.

> "For *Sal* seeds and *Kendu* leaves we have constructed storage centres under the supervision of LAMPS. More than 50 storage centres are there in the districts of Bankura, Purulia and West Midnapur. However, these are purely for *Sal* seeds and *Kendu* leaves not for any other NTFPs." (Assistant Managing Director, WBTDCC, semi-structured interview, 16th September 2008)

Therefore, the majority of government storage centres for NTFPs are controlled by LAMPS in the research area. The total storage capacity of these centres, however, is not great enough to meet demand. To improve its present storage capacity, the WBTDCC has already taken some initiatives. The Assistant Managing Director of the WBTDCC has remarked (semi-structured interview, 16th September 2008) that, "we are trying for the improvement of our current storage facility. We have taken loan from the Ministry of Tribal Affairs, Government of India to create some more storage as well as marketing centres. Even in the running year [2008] we have opened a few new storage centres".

At the preliminary stages of improving NTFP storage capacity, the involvement of the State Forest Department is very important. The ADFO of Jhargram Division in West Midnapur district (semi-structured interview, 27th November 2008) thinks, "...at the initial stage the initiative for the set up of storage centres must be taken by the Government. Later, the liability of these storage centres could be given up to the local communities and they will do the further renovation or extension according to their needs. There are some very good JFM committees in Jhargram Division. Initially the Forest Department can make some storage centres for these FPCs and afterwards Forest Department can give them the full responsibility of these storage centres. A nominal charge Forest Department can take from

them, who will be storing. Once the system starts working and industrial units come to know about these centres, then these centres will also be working as marketing centres. Thus systematic collection of NTFPs will also increase".

Fig. 8.9: LAMPS office and storage centres at Sirkabad village in Arsha range of Purulia district (left) and Katiam village in Ranibandh range of Bankura district

Photo: Ghosal, S.

However, the PCCF, Government of West Bengal said (elite interview, 18th September 2008) that, "… We [Forest Department] simply cannot build-up some infrastructure for storing for some very small quantities of produce. It is not economic. Somebody may grow some medicinal plants in a very small quantity or may collect something from the forest in a very small quantity you cannot make a storage centre for that. If the quantity is good enough then only Forest Department will think about it. For example, a good amount of Sal seeds and Kendu leaves are collected in these three Districts every year so we have taken some initiatives for the systematic storage and marketing of these two products, giving monopoly rights to the WBTDCC".

Therefore, there is inconsistency amongst Forest Department officers regarding the setup of further storage centres for NTFPs in the dry-deciduous forest areas of the south-western part of the State. As a result, this has hindered the storage of collected NTFPs in a systematic and scientific way.

The Ajodhya hill forest is a good source of several medicinal plants and from there forest dwellers collect large amounts of medicinal herbs each year. Therefore, Purulia Forest Division has already sent a proposal to the National Board of Medicinal Plant (NBMP) for the scientific harvesting and storage of the collected herbs. The Additional Divisional Forest Officer of Purulia Division mentioned that three different places have been identified for building these storage centres. The locations are Baghmundi, Ajodhya and Arsha. The

location of the storage centres will be at the Block level. The Forest Division is also planning to train actual collectors to improve their household-based storage systems for medicinal plants. The main focus of this project is on herbal plants, but some other NTFPs which have multiple uses will also get priority. Thus, the same initiative is also urgently needed for other NTFPs collected in the District. Otherwise, the depletion of NTFPs will be continued just because of the lack of a proper storage centre (ADFO, Purulia Division, Purulia, semi-structured interview, 30th September 2008).

The scenario is same for the other two Districts. In Bankura district, there are only a few LAMPS-controlled storage centres and these are only involved with the storage of Sal seeds and Kendu leaves. As a result, most forest dwellers are forced to store their collected products in their house for a while and try to sell them as quickly as possible (before they rot), even if this means that they sometimes get a very low price for them. Naturally, there are some middlemen or mobile agents who take advantage of this situation and buy NTFPs very cheaply from these villagers. Thus, in most cases, the actual collectors do not get a good price for their backbreaking work because of the lack of a suitable storage facility. The Ranger of Ranibandh range in Bankura district mentioned that "only the LAMPS has a storage centre in Ranibandh range which stores Kendu leaves and Sal seeds but forest people, who live far from this storage centre, do not store their NTFPs there, but prefer to keep their collected products at home" (Semi-structured interview, 6th November 2008). Supporting the comments of the Ranger, the Jamdaha villagers of Ranibandh range (Bankura district) remarked,

> "*If we get a good storage centre near our village then we can store our collected products there so that when we will get good price then only we will sell our collected products. Forest Department can make the storage centre initially and after that if they ask us we can take care of that storage centre. We will take care of the centre because only we will be using it and it will benefit us because we can use the centre for marketing purpose also. If Forest Department supply us different plant species in regular basis wh*ich produce NTFPs *then we can plant those species so that the supply of NTFPs remains intact."* (Group discussion, 4th November 2008, the medium of discussion was Bengali)

Some important steps have been made by the Ramakrishna Mission Lokasiksha Parishad, Narendrapur to alleviate this problem in recent years as they have attempted to address the systematic harvesting, storage and marketing of NTFPs in Purulia, Bankura and West Midnapur districts at the grassroots level. When the Organisation sets up an NTFP storage centre, they give special attention to three criterias. First, the storage centre must be well-

structured to conserve NTFPs from damp weather. As NTFPs are biological products, they can spoil within quite a short period of time if they are not kept in a dry place. Second, proper ventilation of the storage centre is very important to maintain the temperature as well as the humidity of the store. Finally, they make efforts to fumigate their stores to protect NTFPs from insects.

The Ramakrishna Mission Lokasiksha Parishad also tries to manage an area of open space near the storage centre where NTFPs can be dried under sunshine before storage. They do not get any financial or technical assistance from the government for building these storage centres however. These storage centres are funded and built entirely by the Ramakrishna Mission Lokasiksha Parishad from profits obtained from selling NTFPs. Not all of these centres have hi-tech facilities. Many forest dwellers come to these centres to store their NTFPs for a while, after which they sell it for a better price than they would have achieved otherwise. Thus, these centres are used as depots as well as marketing centres and forest villagers are encouraged to take care of these centres.

> "*Ramakrishna Mission collects Kalmegh from us directly. Although, this year they haven't come, we don't know why. They have a storage centre also in our village. They don't collect every year and all throughout the year – only a few months especially during winter."* (Katiam villagers, Ranibandh range, Bankura district, group discussion, 6th November 2008, the medium of discussion was Bengali)

Fig. 8.10: Group discussion with staff members of the JFM Wing of Ramakrishna Mission Lokasiksha Parishad (16-09-2008), (right) Ramakrishna Mission Ashrama, Narendrapur, Kolkata

However, staff members of the JFM Wing of Ramakrishna Mission Lokasiksha Parishad (group discussion (Fig. 8.10), 16th September 2008, the medium of discussion were Bengali and English) think that, "*the present storage capacity and the infrastructure of these centres*

is not at all adequate compared to the total collected NTFPs in the region, even the amount of NTFPs what is collected at the Ajodhya hill areas cannot be stored in these storage centre".

As not all types of NTFPs can be harvested throughout the year, the Ramakrishna Mission Lokasiksha Parishad try to store as many NTFPs as they currently have storage capacity for and they plan to improve their present infrastructure in the near future. The work that they do is voluntary and non-profit making.

8.8 Storage of NTFPs by informal sectors

According to the Ranger of Arsha range in Purulia district, the greatest quantities of NTFPs in the dry-deciduous forest of West Bengal are harvested through informal channels (semi-structured interview, 24th September 2008). Collectors usually store their NTFPs in their house and sell them whenever they find a purchaser, as they often cannot afford to wait for a higher price. Taking advantage of this situation, mobile agents visit remote forest villages on a regular basis to purchase NTFPs, including Sal plates from villagers. Forest villagers sometimes come to the local market (*hat*) to sell their collected products. At most, they usually store their NTFPs at home for just overnight and try to sell them the next morning.

> "There is no well organized storage facility in West Bengal. Actual collectors collect NTFPs and keep for a while in their house only. And in most cases they sell their collected products on the next day only as they need money immediately. In Chhattisgarh and Madhya Pradesh they have very formal storage or processing facilities of NTFPs." (PCCF, Government of West Bengal, elite interview, 18th September 2008)

The DFO of Jhargram Division in West Midnapur district (semi-structured interview, 28th November 2008) mentioned that after collecting NTFPs, forest dwellers try to sell them to middlemen or mobile agents. As many of these are not particularly affluent, they tend to store these NTFPs in their houses but some middlemen, especially those living close to towns, own small warehouses. After collecting NTFPs from villagers, they dry them and sort them. Following grading these NTFPs, they send them to district level wholesalers or to Kolkata for further processing and marketing.

Fig. 8.11: Village level mobile agent (left) and Block level wholesaler owned storage centres for Sal plates at Jamboni block in West Midnapur district

Photo: Ghosal, S.

There are some areas in all three Districts, where the socio-economic status of mobile agents is little better than the villagers themselves, but they have no space to store NTFPs. That is why, after collecting NTFPs from forest villagers, these mobile agents sell them straight on to block level or district level wholesalers.

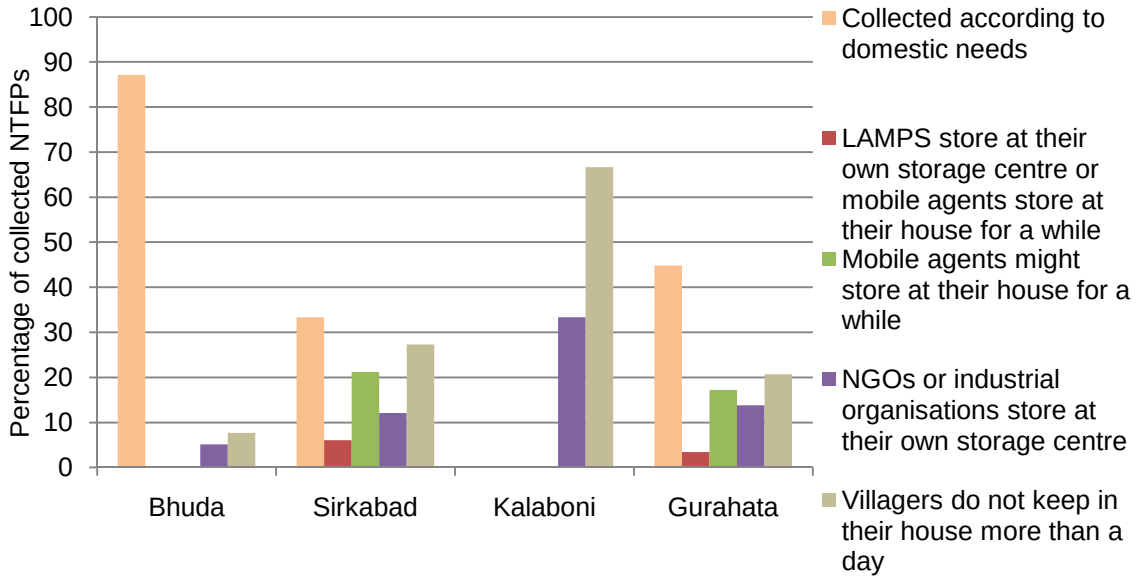
> *"We do not have any storage centre here. There is no government or private storage centre in or near our village where we can store, because of that we do not collect extra product. As much we need for our household use or we can sell in a day, we collect that much only. Those product which are not used in raw form or which has no market demand we do not collect those products."* (Shushni villagers, Jamboni range, West Midnapur district, group discussion, 15th December 2008, the medium of discussion was Bengali)

In Purulia and Bankura districts, the situation is even worse and storage centres are urgently needed because of the poor transportation infrastructure and the lack of immediate marketing opportunities. According to the ADFO, Bankura South Forest Division of Bankura district (semi-structured interview, 7th November 2008), "the collection of NTFPs in a large quantity is always a time taking matter, for the transportation again it takes some times as the transportation is not at all good in the District. Therefore, cold storage like storage facility should be there at the beat or at least at the range level … if government cannot do then industrial units can be invited to make their own storage centre and government will assist them. Industrial units will collect NTFPs from villagers directly and store in their own storage

centres and finally when they will get enough quantity of product then they can send it to their production unit".

Graphs 8.12, 8.13 and 8.14 show the storage features of NTFPs in the dry-deciduous forest areas of south-western part of West Bengal. The NTFPs are collected and stored for two purposes – a) domestic use and b) commercial use.

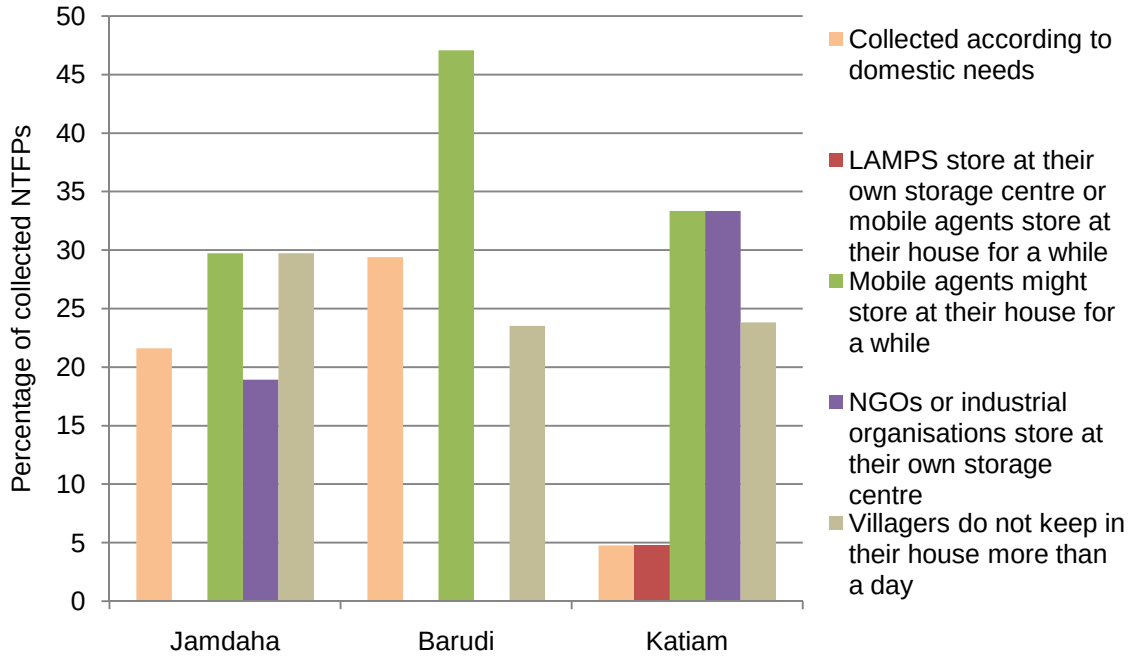
Graph 8.12: Available storage facilities for NTFPs collected in Arsha range of Purulia district



Source of data: Based on questionnaire survey

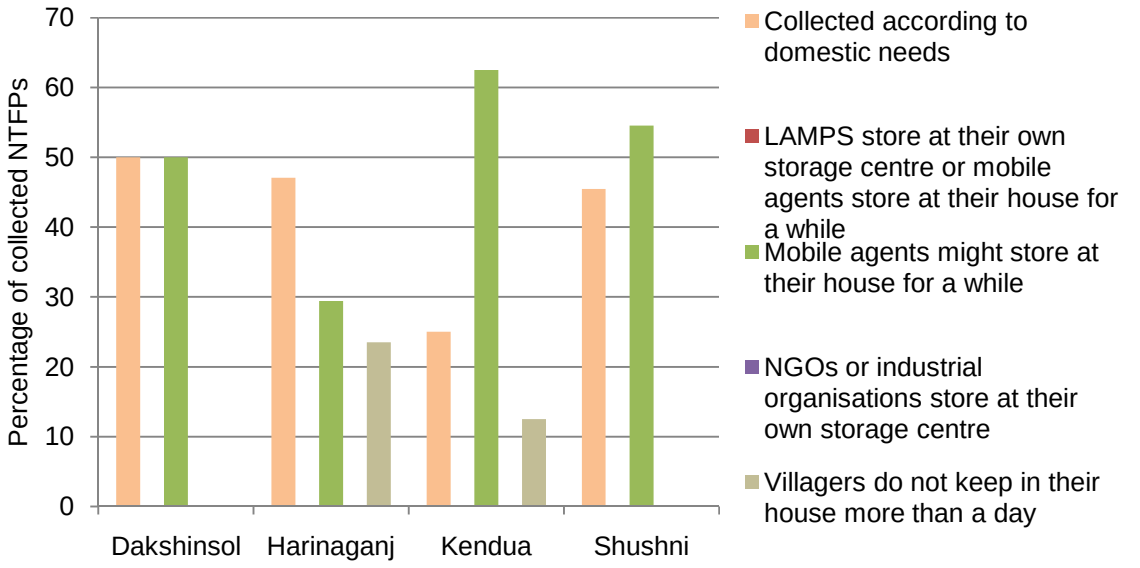
Forest communities, which are within the forest interior, and distant from local markets, normally collect NTFPs just for their own use. Bhuda village (Graph 8.12) in Arsha range of Purulia district and Jamdaha and Barudi village (Graph 8.13) in Ranibandh range of Bankura districts are the good example of such remote forest communities. Mobile agents or middlemen visit these remote villages on a regular basis to collect NTFPs and they store them in their houses for a while. By contrast, collectors who live in villages that are located near to local markets, or to where LAMPS or non-governmental storage centres are situated, usually collect NTFPs for sale and store them at these storage centres. Therefore, if there is a well-organised storage system, then that can reflect how much and which NTFPs different forest communities collect for commercial purpose each year. The nature of storage also indicates the distance between the forest, forest communities and the local market.

Graph 8.13: Available storage facilities for NTFPs collected in Ranibandh range of Bankura district



Source of data: Based on questionnaire survey

Graph 8.14: Available storage facilities for NTFPs collected in Jamboni range of West Midnapur district



Source of data: Based on questionnaire survey

8.9 Conclusion

The ability of villagers to collect and properly store NTFPs has a very important impact on forest livelihoods, forest management and future forest development. However, the well-organized collection and storage of NTFPs has received little attention to date in the study area. According to the Managing Director of the WBFDC (elite interview, 24th October 2008), before NTFPs are harvested, particularly for commercial purposes, it is extremely important to enhance the local knowledge base regarding the overall NTFPs harvesting procedure. After identifying the available NTFPs at the local level, collection and storage procedures have to be built up and then a formal marketing system can be developed. However, people tend to think just about NTFP marketing and ignore these other stages. In order to facilitate the development of policies and practices for more sustainable systems of NTFP harvesting that can have a positive impact on forest-based livelihoods, there is an urgent need for action. The Forest Department's research wing, local universities and research organisations should undertake collaborative research to support the NTFP trade whilst protecting forest livelihoods and ecosystems.

> "Collection of minor forest produces at the appropriate time and their proper storage for the protection against damp and insect are essential to improve the trade of minor forest produce. This trade of minor forest produce if organised properly that will improve the economic status of the village people specially the tribals." (Forest Survey of India Eastern Zone, 1985, p. 31)

Presently, the unsustainable collection and limited storage capacity for NTFPs are significant problems for the West Bengal Forest Department as these are causing many NTFPs to become rare or endangered. Some NTFPs in the study area are not only important for human beings, but also for wildlife. Unsustainable and irrational collections of NTFPs can expand damage of forest resources leading to food crises for some wildlife. This may create significant problems for local villagers, such as invasion of croplands and village life by wild animals. The Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region (elite interview, 21st October 2008) thinks, for the commercial collection of NTFPs, plantations might be the better option and that can be achieved on fallow land, barren land and forest fringe areas which are available in these three Districts.

Negi and Bhalla (2002, p. 643) argue that the "collection of medicinal and aromatic plants [NTFPs] is a tedious and laborious job due to scattered nature of the products. Collectors have to make frequent visits to the areas for collection of these products.... However, specific visits for the purpose are also made which are well planned and the collectors stay in the

areas (often in open) for about a week as well." If forest fringe people go into the forest and do not follow the same path then that can have an impact on the forest ecology. If, after collecting plants, villagers drag these products over the ground, this can also have a negative impact on the ground vegetation. With this in mind, the ADFO of Purulia Division of Purulia district (semi-structured interview, 30th September 2008) mentioned that "the sustainable and scientific cultivation of NTFPs can help to protect the protected dry-deciduous forest areas of Purulia district preventing the depletion of natural resource base. These arguments need to be borne in mind as part of an effort to improve the environmental and socio-economic sustainability of NTFP collection".

The involvement of non-profit making NGOs, such as the Ramakrishna Mission Lokasiksha Parisad in assisting and advising collectors about the collection, storage and marketing of NTFPs, would be beneficial in this regard. Until recently, most NTFPs collection in dry-deciduous forest area was controlled by mobile agents and middlemen, who were concerned mainly with monetary profit. "[NTFPs] Collection is carried out by middlemen at the village level. Intensive collection under an organised body may improve the situation and can create an impact on the rural economy" (Forest Survey of India Eastern Zone, 1985, p. 47).

On the other hand, a more systematic collection system and greater storage capacity will encourage forest dwellers to collect more NTFPs for commercial purposes. The collection for commercial purposes has to be done in a sustainable manner, otherwise it creates additional problems. If the number of storage centres is greatly increased and industrial units are set up to process NTFPs, then forest villagers will respond by increasing the amount of NTFPs collected, which will create further pressure on the native forest.

Greater awareness of the importance of collecting NTFPs in ways and at times that cause minimum damage to the wider forest ecosystem is, therefore, needed to protect forest livelihoods and ecology in the longer term. The optimum collection and storage techniques are different for different species and this information needs to be conveyed to actual collectors. At the same time, NTFP marketing channels will also need to be reorganised in ways that help to improve the socio-economic status of forest dwellers, whilst reducing their dependence on environmentally damaging forest-based activities, such as illegal timber felling.

Chapter 9

Marketing of NTFPs in the dry-deciduous forest area of West Bengal

9.1 Introduction

The most important part of the whole process of NTFPs harvesting is its marketing. The proper identification, documentation, systematic collection, improvement of scientific storage facilities for NTFPs are all needed ultimately to build up a proper marketing channels (Katiyar, 2007). On the one hand, proper marketing of NTFPs can help forest dwellers to improve their socio-economic position and, at the same time, it can also help to protect the dry-deciduous forests of West Bengal (ADFO, Jhargram Division, West Midnapur district, semi-structured interview, 27th November 2008).

> "NTFPs were known as Minor Forest Produce (MFP) since 1980s, but the change in terminology was necessitated due to the fact that the produce in reality is neither minor in economic terms or from social angle. NTFPs are generally the major source of earning for the fringe population in a forest based ecosystem and have either some industrial use as raw material or as food item."(DFO – Bankura North Division, 2008, p. 19)

NTFPs are now receiving more importance compared to timber products all over the world, largely due to their role in forest livelihoods (Peters *et al.*, 1989; Pfund and Robinson, 2005). According to Shvidenko *et al.* (2005), many tribal communities living in tropical forests are significantly dependent on NTFPs as their primary source of income. The situation is quite similar in the case of forest villages in Jharkhand (Corbridge *et al.*, 2004). However, in most cases, the marketing of NTFPs is not well-organised in India (Negi and Bhalla, 2002). Most NTFPs (Fig. 9.1) are sold by forest dwellers to middlemen or mobile agents and exploitation is quite noticeable. A lack of suitable storage facilities, limited transportation systems and inadequate marketing information are the main reasons for the involvement of middlemen and mobile agents.

In West Bengal, government departments including the Forest Department, NGOs and forest and environmental researchers in the last three decades (Ramakrishna Mission Lokasiksha Parishad, 1996 and 2004; Malhotra *et al.*, 1998; Rao, 1997) have already completed several studies on marketing opportunities for NTFPs. However, some gaps still prevail in knowledge development and, because of that, the informal marketing channels are still stronger than the

government controlled marketing system and ultimately actual collectors are exploited by middlemen. According to the Assistant Managing Director of WBTDCC (semi-structured interview, 16th September 2008),

> "At present, the formal marketing system of *Kendu* leaves and *Sal* seeds is stronger than the informal sector. However, in case of other NTFPs, no such type of well-organised marketing channels has been developed so far. … A huge amount of NTFPs are marketed through informal channels and the value is not accounted. Government has no record of such marketing. … if we can calculate the monetary value of *Sal* leaves business in South Bengal then it could be millions of rupees."

Fig. 9.1: Forest villagers sell jewelleries made from NTFPs at the local market (*hat*); there is no organised marketing channel for Bel (top middle), Lodh bark (right corner), Mahua flower (bottom middle) and Haritaki in West Bengal

Photo: Ghosal, S.

This chapter makes a comparative analysis between the formal and informal marketing channels of NTFPs in dry-deciduous forest areas of the State. The advantages and disadvantages of the formal marketing channels, the advantages and disadvantages of the informal marketing channels and how the problems of exploitation could be reduced will all be discussed in this chapter.

9.2 Marketing of NTFPs through government authorised bodies

According to Pfund and Robinson (2005), the markets for NTFPs are incredibly 'diverse' and 'specialised'. For this reason, a well-organised marketing system is needed for the sustainable harvesting of NTFPs as well as to protect the forest resource base. In India, government controlled marketing channels for NTFPs are well-organised compared to informal marketing channels (Forest Survey of India, 1985, p. 23). Normally, in government authorised channels, the marketing of NTFPs is underaken through an auction and permit system. State Forest Departments also give monopoly rights to some of the authorised

bodies (such as LAMPS) for the harvesting of a few NTFPs (such as Kendu leaves and Sal seeds) on the payment of a royalty.

The Deputy Director in Charge of the Regional Office of the Forest Survey of India, Eastern Region stated (elite interview, 21st October 2008), "the scenario is quite similar in the dry-deciduous forest area of West Bengal, where only Sal seeds and Kendu leaves are marketed by LAMPS, whereas, other NTFPs are normally sold through informal marketing channels". The WBFDC is involved in the harvesting of cashew nuts in West Midnapur district, but normally that is collected from planted forests. Apart from cashew nuts, the WBFDC markets honey (collected from Sunderbans Tiger Reserve and National Park of South Bengal) and citronella oil, which is produced in North Bengal. The benefits of government authorised NTFP marketing channels are manifold compared to informal channels.

9.2.1 Importance of formal marketing channels

NTFPs are very important in the lives of forest dwellers living in the dry deciduous forests of south-western West Bengal. The FPC members of this area can collect NTFPs for their household needs as well as to sell at the local market (Government of West Bengal – Directorate of Forests, 1997, p. 35). Normally, in the formal marketing channels, sustainable harvesting gets priority to preserve the resource base. Some restrictions, including how much NTFPs could be harvested from a certain forest area in a season, are always maintained in the formal marketing system.

According to the Ranger of Ranibandh range in Bankura district (semi-structured interview, 6th November 2008), since the Forest Department has exempted FPC members from payment for the collection of NTFPs, they can decide the price of their collected product according to demand and availability. Forest Department authorised bodies help them to evaluate the appropriate price. On the other hand, when NTFPs are marketed through informal marketing channels there is no such fixed price list. For example, for Mahua flower and Sal seeds collectors of Katiam village in Ranibandh block get payment in salt from middlemen, whereas, for the same products other villagers are paid in cash. Thus, the barter system still prevails in some remote villages.

Although the harvesting of NTFPs is now a secondary source of income for a large number of forest dwellers, it is necessary to maintain an appropriate price for their collected NTFPs to enhance their socio-economic condition and to reduce the misuse of NTFPs. This is, however, only possible with government intervention. Unless the NTFP marketing system is formalized or alternative non-forest livelihoods are developed, villagers' socio-economic

status will not be improved and the dependence on forests will remain as it is. Therefore, to reduce their dependence on forest, through economic enhancement, the government authorised marketing channels can play an influential role, which may ultimately help to preserve the native forest ecology. The involvement of government organisations can strengthen the position of actual collectors. If actual collectors see that there is a government-authorised body to purchase their collected NTFPs, then they can bargain with mobile agents and middlemen for the appropriate price.

Formal marketing channels may encourage the scientific procedure of collection and storage, so that the wastage of NTFPs is less compared to the informal marketing channels. To preserve forest resources for the future formal marketing channels can play an important role. From Transit Pass (TP) records, the Forest Department is able to know the volume of NTFPs being collected from a particular forest area in a year (Table 9.1). According to that, the Forest Department can decide about future collection of these NTFPs to maintain balance in the forest ecosystem. According to the Ranger of Arsha range (semi-structured interview, 24th September 2008), formal marketing channels can also help to protect native wildlife as the collection of NTFPs can be organised considering the wildlife population and the amount of fodder needed to reduce the risk that they will forage on villagers crops. There are some medicinal NTFPs available in the dry-deciduous forests of West Bengal for which there is no regular demand. They are only collected when mobile agents or industrial representatives ask forest dwellers for them. Otherwise, forest villagers only collect these NTFPs according to their domestic needs.

Table 9.1: Year-wise species rate and outturn of NTFPs for the year of 2005, 2006 and 2007 in Purulia Division, Purulia district						
Sl. No.	NTFP	*Scientific name*	Rate (Rs) per Kg (raw)	Quantity collected (Kg)	Price (Rs)	Mandays for collection
1	Amlaki	*Emblica officinalis*	10.00	170	1705.00	42
2	Haritaki	*Terminalia chebula*	6.00	209	1254.00	31
3	Bahera	*Terminalia bellirica*	5.00	1372	6860.00	171
4	Nishinda leaf	*Vitex negundo*	6.00	559	3354.00	83
5	Satamul	*Asparagus racemosus*	10.00	443	4436.00	110
6	Jam leaf	*Syzyguim cumini*	5.00	44	220.0	6
7	Kukurshoka	*Blumea lacera*	4.00	131	524.00	13
8	Atmora	*Helicteres isora*	5.00	10	50.00	1
9	Bathuri		6.00	79	477.00	12
10	Akanda root	*Calotropis gigantea*	5.00	132	660.00	16
11	Rasna		1.00	2323	2323.00	58
12	Chakunda seeds	*Cassia tora*	4.00	160	640.00	16
13	Apang	*Achyranthes aspera*	1.00	981	981.00	24
Total (2005)				6613	23484.00	583
Sl. No.	NTFP	*Scientific name*	Rate (Rs) per Kg (raw)	Quantity collected (Kg)	Price (Rs)	Mandays for collection
1	Amlaki	*Emblica officinalis*	10.00	137	1370.00	34
2	Haritaki	*Terminalia chebula*	2.00	1045	209.00	5
3	Bahera	*Terminalia bellirica*	1.00	1302	1302.00	33
4	Jangi (Haritaki)	*Terminalia chebula*	5.00	645	322.00	8
5	Kurchi	*Holarrhena pubescens*	40.00 – 45.00 (dry)	295	1622.00	40
6	Kanadi	*Stephania japonica*	7.00	4	40.00	1
7	Kalmegh	*Andrographis paniculata*	7.00	226	1582.00	40
8	Khetpapra	*Hedyotis corymbosa*	5.00	945	4729.00	118
9	Mundi		7.00	680	6805.00	170
Total (2006)				6698	17981.00	449
Sl. No.	NTFP	*Scientific name*	Rate (Rs) per Kg (raw)	Quantity collected (Kg)	Price (Rs)	Mandays for collection
1	Amlaki	*Emblica officinalis*	10.00 (dry)	186	1860.00	47
2	Haritaki	*Terminalia chebula*	7.00 (dry)	121	850.00	21
3	Bahera	*Terminalia bellirica*	6.00 (dry)	31	191.00	5
4	Kurchi	*Holarrhena pubescens*	40.00 – 45.00 (dry)	71	3195.00	80
5	Nishinda leaf	*Vitex negundo*	4.00 (dry)	22	88.00	3
6	Satamul	*Asparagus racemosus*	40.00 – 45.00 (dry)	16	640.00	16
7	Chakunda	*Cassia tora*	4.00 (dry)	3	12.00	5
8	Apang	*Achyranthes aspera*	2.00	21	42.00	1
9	Khetpapra	*Hedyotis corymbosa*	5.00	672	3360.00	88
10	Bandar lathi	*Cassia fistula*	2.00	130	260.00	7
Total (2007)				1144	10498.00	273
Source: Divisional Forest Office, Purulia division, Purulia district						

9.2.1.1 Marketing of NTFPs through WBTDCC

A subsidiary organisation of the WBTDCC, popularly known as LAMPS, works for the socio-economic advancement of marginal forest dwellers through several programmes and schemes (WBTDCC, 2008). Forest Department and WBTDCC staff coordinate meetings with native people to decide which products should be collected and in what volume. They also decide the price of products according to the quality and demand. LAMPS officers maintain the paperwork detailing the annual collection. LAMPS have the monopoly rights from the Forest Department for the marketing of Kendu leaves and Sal seeds collected in the dry-deciduous forests. In return, they pay a certain amount of revenue to Forest Department. These LAMPS were formed (1975) to reduce the exploitation of forest dwellers by middlemen. The Ranger of the Ranbandh range in Bankura district remarked:

> "No. I don't think middlemen or mobile agents are good. It is because to protect actual collectors from these middlemen LAMPS was developed." (Ranger, Ranibandh range, Bankura district, semi-structured interview, 6th November 2008)

The Assistant Managing Director of WBTDCC (semi-structured interview, 16th September 2008) pointed out that the WBTDCC always arranges for the marketing of NTFPs by auction, which must be done in front of actual collectors or LAMPS members, Forest Department staff and industrial units. The industrial unit which pays the highest rate, will obtain the product. The profit will go to actual collectors after the deduction of the credited amount, which they take in advance during the harvesting of products.

Fig. 9.2: Processing and sorting of Kendu leaves at the Katiam (Ranibandh, Bankura district) LAMPS centre for sell to the industrial units

Photo: Ghosal, S.

In the 2005-06 crop year around 13,425 quintals (1 quintal = 100 kg.) of Kendu leaves were collected through LAMPS which created 2, 87,382 mandays[14] in Purulia, Bankura and West Midnapur districts. The total value of the Kendu leaves was Rs. 2, 38, 40,582 (WBTDCC, 2007a). During the same period, 359.44 quintals of Sal seeds were collected from Purulia, Bankura and West Midnapur districts.

Table 9.2: Collection of Kendu leaves and Sal seeds (2002-2006)

Crop Year	Kendu leaves collection			Sal seed collection		
	Collection in qtl.	Expenditure (in Rs)	Mandays generated	Collection in qtl.	Expenditure (in Rs)	Man days generated
2002	3688.82	3467791	57792	0	0	0
2003	6421.21	6995000	115467	0	0	0
2004	11335.00	12474092	205911	1670	501000	9244
2005	10658.00	12377627	204319	11821.88	3605673	59519
2006	13425.00	17201905	283953	350	112350	1854

Source: Annual report 2005-2006, WBTDCC, Kolkata

However, the collection period for Kendu leaves (Table 9.2 and 9.3) is an important factor for its proper marketing, because if it is not collected at the right time, then middlemen or mobile agents will purchase the best quality leaves:

> "Economic activities concerning Kendu leaves start with pruning operation. If pruning is not done in time, good quality leaves will not be available. This operation is supposed to be done by [WB]TDCC engaging the local tribal labourers. They often fail to do this, which results in late sprouting and the local collectors miss the Kolkata markets, which remains dominated by supply of Kendu leaves from Madhya Pradesh or Orissa." (Development and Planning Department, Government of West Bengal, 2007, p. 56)

About 1,827 man days have been created from Sal seed collection (Table 9.2 and 9.3) in these three districts. The total sale value of the Sal seeds was Rs. 1, 15,380. For the collection of Kendu leaves and Sal seeds WBTDCC paid Rs. 12.00/kg and Rs. 3.00/kg respectively to the members of LAMPS (mostly tribal people) or actual collectors. This is one of the highest payments in the whole country (WBTDCC, 2007b; WBTDCC, 2007c).

[14] Man days – Number of people work in a day

Table 9.3: Districtwise Kendu leaves & Sal seeds collections (2004-05 crop year)

MFP item	District	Collection in quintal	Expenditure incurred in Rs.	Mandays generation
Kendu leaves	Purulia	2550.05	3105000	51254
	[West] Midnapur	4077.72	4068462	67158
	Bankura	4707.46	5300130	87490
TOTAL		11335.23	12473592	205902
Sal seeds	Purulia	39.16	11748	194
	[West] Midnapur	1430.31	429093	7083
	Bankura	197.19	59157	977
TOTAL		1666.66	499998	8254

Source: Annual Report 2004-05, WBTDCC, Kolkata

A considerable amount of Babui grass is produced in the dry-deciduous forests of south-western part of West Bengal (Table 9.4). Several forest communities make rope from Babui grass and sell it at the market. The marketing of rope, however, is largely controlled by mobile agents or middlemen. WBTDCC have appealed to the Forest Department of West Bengal to get the monopoly power on collection and marketing of Babui grass, like Kendu leaves and Sal seeds, to protect the rights of actual collectors, but have not been successful.

Table 9.4: Babui grass production and storage capacity in Purulia, Bankura and Midnapur districts

Sl No.	Name of LAMPS	Yearly babui grass production in metric ton (approx)	Existing storage facility for babui grass storage (capacity) in metric ton
1	Baligeria LAMPS	2500	100
2	Nigui LAMPS	1500	Nil
3	Saria-Kendugari LAMPS	1000	300
4	Bandwan (South) LAMPS	1000	50
5	Chirudi LAMPS	750	100
6	Katium LAMPS	1000	300 (2 nos)
7	Churku LAMPS	1000	50 (2 nos)

Source: Report on babui grass production and storage facility, 2005-06, WBTDCC, Kolkata

The lack of knowledge about the production, collection and storage of babui grass is hampering its marketing. The limited storage facilities compared to the total amount of grass collected have created an opportunity for mobile agents or middlemen to exploit the collectors. Mobile agents or middlemen are also collecting other NTFPs directly from actual

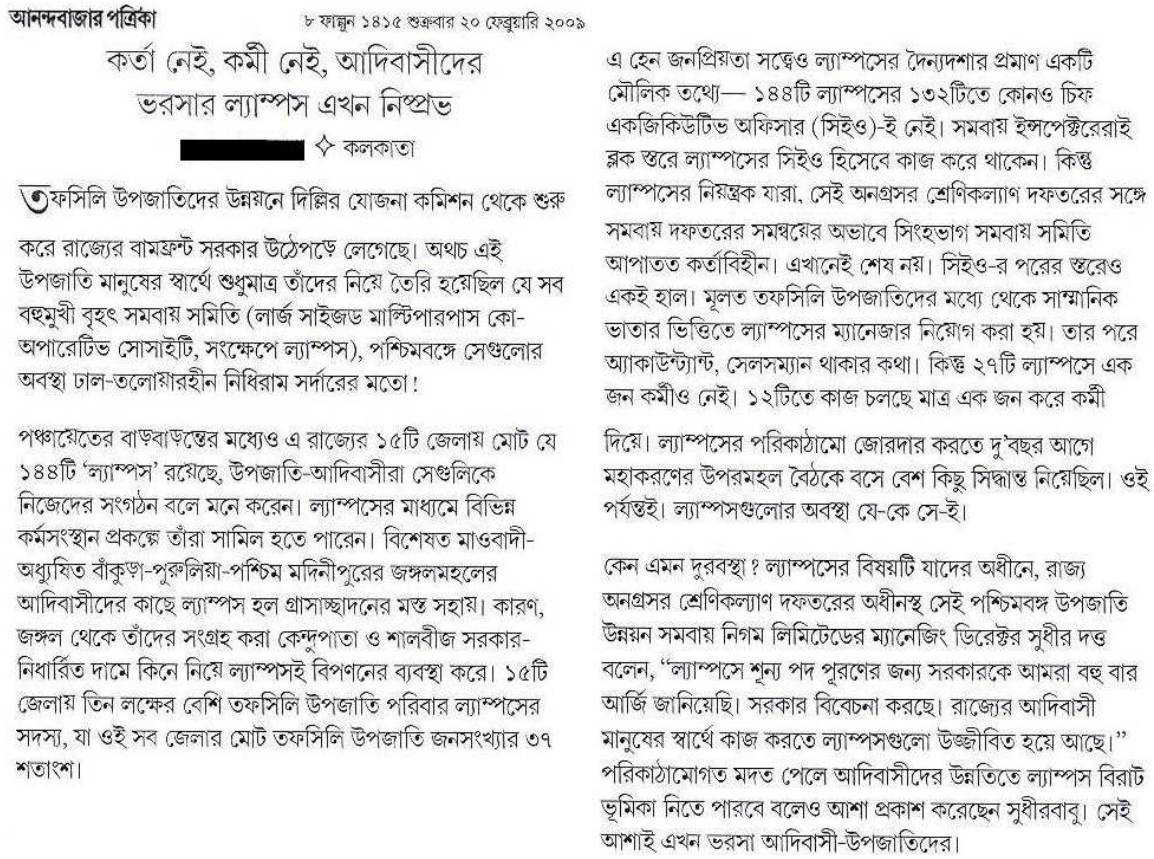
collectors for a very low price and selling them in the open market or to [industrial] producers for a high price (as much as they can through bargaining).

Apart from Sal seeds, Kendu leaves and Babui grass the WBTDCC is also planning to be involved in the collection and marketing of Bamboo, Odal, Citronella, Areca nut, Turmeric and Lac in Purulia district (WBTDCC, 2008, p. 1). However, the present infrastructure of WBTDCC and LAMPS is not good enough to control the marketing of even the total amount of harvested Sal seeds, Kendu leaves and Babui grass in dry-deciduous forests. The number of LAMPS centres is limited in Purulia, Bankura and West Midnapur districts compared to the tribal population and their total collected NTFPs. Sometimes forest dwellers do not wish to go to LAMPS to sell their collected products simply because of the distance and the poor transportation system:

> *"We don't sell [Sal seeds or Kendu leaves] to LAMPS because it is far away from our village and we don't have a bus or any other service to carry our collected products. Mobile agents visit our village once or twice a week so we give them Sal plates, Sal seeds and Kendu leaves. During the season for any particular product they come more often. We know, for our collected products we get less price than the market price but what we can do? We have to take whatever mobile agents give us because we need money every day. We cannot wait to go market once a week and if we go everyday then who will go forest to collect leaves and other products and to go town we have to pay bus fare as well.*" (Kendua Villagers, Jamboni range, West Midnapur districts, group discussion, 14th December 2008, the medium of conversation was Bengali)

After some recent newspaper reports (Fig. 9.3), the WBTDCC is thinking about expanding their present infrastructure as well as to modernize the LAMPS storage and marketing centres. For this purpose, the Managing Director of WBTDCC has already made recommendations to the Forest Department. The lack of financial ability always creates problems in recruiting enough staff for each LAMPS and to modify LAMPS centres. The Assistant Managing Director of WBTDCC (semi-structured interview, 16th September 2008) also plans to implement central government schemes to improve the present socio-economic status of LAMPS members and for the enhancement of LAMPS activities.

Fig. 9.3: Present condition of LAMPS in Purulia, Bankura and West Midnapur districts



আনন্দবাজার পত্রিকা ৮ ফাল্গুন ১৪১৫ শুক্রবার ২০ ফেব্রুয়ারি ২০০৯

কর্তা নেই, কর্মী নেই, আদিবাসীদের ভরসার ল্যাম্পস এখন নিষ্প্রভ

[redacted] ✧ কলকাতা

তফসিলি উপজাতিদের উন্নয়নে দিল্লির যোজনা কমিশন থেকে শুরু করে রাজ্যের বামফ্রন্ট সরকার উঠেপড়ে লেগেছে। অথচ এই উপজাতি মানুষের স্বার্থে শুধুমাত্র তাঁদের নিয়ে তৈরি হয়েছিল যে সব বহুমুখী বৃহৎ সমবায় সমিতি (লার্জ সাইজড মাল্টিপারপাস কো-অপারেটিভ সোসাইটি, সংক্ষেপে ল্যাম্পস), পশ্চিমবঙ্গে সেগুলোর অবস্থা ঢাল-তলোয়ারহীন নিধিরাম সর্দারের মতো!

পঞ্চায়েতের বাড়বাড়ন্তের মধ্যেও এ রাজ্যের ১৫টি জেলায় মোট যে ১৪৪টি 'ল্যাম্পস' রয়েছে, উপজাতি-আদিবাসীরা সেগুলিকে নিজেদের সংগঠন বলে মনে করেন। ল্যাম্পসের মাধ্যমে বিভিন্ন কর্মসংস্থান প্রকল্পে তাঁরা সামিল হতে পারেন। বিশেষত মাওবাদী-অধ্যুষিত বাঁকুড়া-পুরুলিয়া-পশ্চিম মেদিনীপুরের জঙ্গলমহলের আদিবাসীদের কাছে ল্যাম্পস হল গ্রাসাচ্ছাদনের মস্ত সহায়। কারণ, জঙ্গল থেকে তাঁদের সংগ্রহ করা কেন্দুপাতা ও শালবীজ সরকার-নির্ধারিত দামে কিনে নিয়ে ল্যাম্পসই বিপণনের ব্যবস্থা করে। ১৫টি জেলায় তিন লক্ষের বেশি তফসিলি উপজাতি পরিবার ল্যাম্পসের সদস্য, যা ওই সব জেলার মোট তফসিলি উপজাতি জনসংখ্যার ৩৭ শতাংশ।

এ হেন জনপ্রিয়তা সত্ত্বেও ল্যাম্পসের দৈন্যদশার প্রমাণ একটি মৌলিক তথ্যে— ১৪৪টি ল্যাম্পসের ১৩২টিতে কোনও চিফ একজিকিউটিভ অফিসার (সিইও)-ই নেই। সমবায় ইন্সপেক্টরেরাই ব্লক স্তরে ল্যাম্পসের সিইও হিসেবে কাজ করে থাকেন। কিন্তু ল্যাম্পসের নিয়ন্ত্রক যারা, সেই অনগ্রসর শ্রেণিকল্যাণ দফতরের সঙ্গে সমবায় দফতরের সমন্বয়ের অভাবে সিংহভাগ সমবায় সমিতি আপাতত কর্তাবিহীন। এখানেই শেষ নয়। সিইও-র পরের স্তরেও একই হাল। মূলত তফসিলি উপজাতিদের মধ্যে থেকে সাম্মানিক ভাতার ভিত্তিতে ল্যাম্পসের ম্যানেজার নিয়োগ করা হয়। তার পরে অ্যাকাউন্ট্যান্ট, সেলসম্যান থাকার কথা। কিন্তু ২৭টি ল্যাম্পসে এক জন কর্মীও নেই। ১২টিতে কাজ চলছে মাত্র এক জন করে কর্মী দিয়ে। ল্যাম্পসের পরিকাঠামো জোরদার করতে দু'বছর আগে মহাকরণের উপরমহল বৈঠকে বসে বেশ কিছু সিদ্ধান্ত নিয়েছিল। ওই পর্যন্তই। ল্যাম্পসগুলোর অবস্থা যে-কে সে-ই।

কেন এমন দুরবস্থা? ল্যাম্পসের বিষয়টি যাদের অধীনে, রাজ্য অনগ্রসর শ্রেণিকল্যাণ দফতরের অধীনস্থ সেই পশ্চিমবঙ্গ উপজাতি উন্নয়ন সমবায় নিগম লিমিটেডের ম্যানেজিং ডিরেক্টর সুধীর দত্ত বলেন, "ল্যাম্পসে শূন্য পদ পূরণের জন্য সরকারকে আমরা বহু বার আর্জি জানিয়েছি। সরকার বিবেচনা করছে। রাজ্যের আদিবাসী মানুষের স্বার্থে কাজ করতে ল্যাম্পসগুলো উজ্জীবিত হয়ে আছে।" পরিকাঠামোগত মদত পেলে আদিবাসীদের উন্নতিতে ল্যাম্পস বিরাট ভূমিকা নিতে পারবে বলেও আশা প্রকাশ করেছেন সুধীরবাবু। সেই আশাই এখন ভরসা আদিবাসী-উপজাতিদের।

Translation

For the development of tribal people, the Planning Commission, Government of India as well as the West Bengal State Government has taken several initiatives. However, one of the major initiatives, the LAMPS, formed to serve this purpose are in a poor condition in West Bengal. The tribal people consider these 144 LAMPS in 15 Districts as their own organisation. They can participate in different employment programmes through these LAMPS. Especially, in the districts of Purulia, Bankura and West Midnapur, where Maoists are very active, LAMPS work as an important institution for the livelihoods of forest fringe dwellers. LAMPS do the marketing of Kendu leaves and Sal seeds which are collected by tribal forest dwellers. In 15 districts about 300 thousand tribal people (37% of total tribal population of these districts) are members of LAMPS.

Although LAMPS are very popular among forest dwellers, the following information shows their poor condition – among 144 LAMPS, 132 have no Chief Executive Officer (CEO). The block level Cooperative Inspectors normally work as CEOs of LAMPS. However, because of the lack of alliance between WBTDCC, the controlling body of LAMPS, and the Cooperative Society, the LAMPS are working in the absence of a CEO. The misery does not end here. The situation is the same for the next post to CEO. Usually, managers of LAMPS are often employed from tribal families paying a monthly salary. An accountant and salesmen are supposed to work under them. However, surprisingly, 27 LAMPS have no employees and about 12 LAMPS are presently working with a solo staff managing everything. For the improvement of the infrastructure of LAMPS a high level committee arranged a meeting about two years back but things remained unchanged.

Why the condition of LAMPS is like this? The Managing Director of LAMPS Mr Sudhir Dutta said, "We have requested the State government numerous times to fill the vacant posts of LAMPS. The State Government is thinking about it. For the interests of tribal people of West Bengal, LAMPS are active". Mr. Sudhir Dutta anticipates that if the infrastructures of LAMPS are improved then it can take a significant role in tribal development. The tribal poor are also banking on the same hope.

Courtesy: Ananda Bazar Patrika (a Bengali daily news paper), Feb' 20, 2009 (Translated by the Researcher)
http://www.anandabazar.com/20raj6.htm

9.2.1.2 The WBFDC controlled marketing channels for NTFPs

The most important government authorised body for the marketing of forest products in West Bengal is the WBFDC. Although, the organisation is primarily involved in the marketing of timber products, they also market some NTFPs. In North Bengal, they collect citronella grass to produce oil. In South Bengal, they collect honey from the Sunderbans and from the planted forests of West Midnapur district they collect cashew nuts. Thus, the NTFPs business of WBFDC is limited to a few products only.

Fig. 9.4: Elite interview with the Managing Director of WBFDC (24-10-2008), Office of the Managing Director (right), Kolkata

Photo: Ghosal, S.

According to the present Managing Director of WBFDC (elite interview, 24th October 2008; Fig. 9.4), "the WBFDC tried in the past to use its existing infrastructure for NTFP business; however, the idea of the State Government was, the total benefit of NTFPs should go to native forest people. Initially, the idea was that the collection of NTFPs should be done by some tribal organisations such as LAMPS. Therefore WBFDC did not involve in NTFPs business…even then some initiative was taken but they were not cost-effective..."

However, the WBFDC is planning to become involved in NTFPs business, particularly for those products which are collected as decorative items in North Bengal. These products are currently exported to other states or even overseas countries through informal channels. The market demand for these products is also very high. Nevertheless, the Forest Department has not yet given permission for the WBFDC to become involved in the marketing of these products. Moreover, the Forest Department of West Bengal is even planning to harvest timber products by themselves. This is because the Forest Department has developed its own infrastructure and it wants to increase its annual turnover by becoming involved directly

in the timber business. Thus, instead of allowing WBFDC to boost up its forest product harvesting, the Forest Department is reducing its activities:

> "Gradually, Forest Directorate decreasing WBFDC's authority of collecting forest products and trying to do by themselves as Forest Department's infrastructure is becoming good to maximise the royalty, they get out of forest products. If the Forest Department do it by themselves, then royalty will go directly to them not via us. … The PCCF is gradually reducing WBFDC activities of forest products harvesting to do the marketing of forest products independently. Days are coming when WBFDC will be in a poor position. WBFDC should start thinking about it. Corporation's other activities have to be developed otherwise it will not survive for a long." (Company Secretary cum Chief Accounts Officer, WBFDC, semi-structured interview, 24th October 2008)

Table 9.5: Production, purchasing and collection of NTFPs by the WBFDC during the financial year of 2005-06

Sl. No.	NTFPs	Production	Purchase	From other division	Total
1	Citronella grass (kg.)	-	-	-	-
2	Cashew nut seeds (Qnt.)	3,976	-	-	3,976
3	Honey (kg.)	23,494	61,120	990	85,604
4	Turmeric (kg.)	-	-	-	-
5	Citronella Oil (Ltr.)	-	977	65	1,042
6	Katha Cake (kg.)	-	-	-	-

Source: 32nd Annual Report 2005-2006, WBFDC, Kolkata

Table 9.5 shows that the amount of NTFPs harvested and marketed by WBFDC is clearly restricted even compared to WBTDCC. Although WBFDC has its own network at the range or sometimes beat level, even then they cannot use their existing infrastructure for NTFP related business. On the other hand, the WBTDCC is suffering due to their limited competency regarding the storage and marketing of NTFPs. This predicament means that middlemen are able to take unfair advantage of actual collectors.

The Forest Department gets some idea about the annual amount of NTFP harvesting and marketing from the records of WBFDC, WBTDCC, other government authorised NGOs and transit passes issued by the relevant Divisional Forest Officers. Table 9.6 shows the total annual amount of harvested NTFPs through formal marketing channels in West Midnapur district in 2007 – 08. This record can play an important role in future policy-making regarding the harvesting of NTFPs and for the improvement of forest livelihoods. On the other hand,

NTFPs that are marketed through informal channels are not recorded. Unfortunately, the total amount of NTFPs marketed through informal channels is moderately higher than through formal channels in these three districts. These figures, therefore, underestimate the potential of NTFPs for improving forest livelihoods.

Table 9.6: Outturns of minor forest produce during 2007 – 08 in Jhargram division of West Midnapur district

Sl. No.	Item	Quantity	Agency operation
1.	Kendu leaves	6632.32 qtl.	LAMPS & Private
2.	Sal seed	955.45 qtl.	LAMPS
3.	Cashew	1575.25 qtl	Private
4.	Mahua seeds	403.24 qtl.	Private
5.	Mahua flowers	225.00 qtl.	Do
6.	Bahera	195.00 qtl.	Do
7.	Amlaki	100.00 qtl.	Do
8.	Kalmegh	50.00 qtl.	Do
9.	Haritaki	53.00 qtl.	Do
10.	Anantamul	50.00 qtl.	Do
11.	Satamul	43.00 qtl.	Do
12.	Dudhilata	50.00 qtl.	Do
13.	Arjun bark	22.00 qtl.	Do
14.	Karanj seed	222.00 qtl.	Do
15.	Indrajab seeds	24.00 qtl.	Do
16.	Kurchi bark	20.00 qtl.	Do
17.	Mushroom	5.00 qtl.	Do
18.	Kalmegh	35.00 qtl.	Do
19.	Bel	100.00 qtl.	Do
20.	Shibjata	22.00 qtl.	Do
21.	Kusum fruits	50.00 qtl.	Do
22.	Lodh bark	25.00 qtl.	Do
23.	Piyal seeds	23.00 qtl.	Do
24.	Neem seeds	125.00 qtl.	Do
25.	Asan seeds	25.00 qtl.	Do
26.	Kuchla	10.00 qtl.	Do
27.	Bhunrur	5.00 qtl.	Do
28.	Tentul	100.00 qtl.	Do
29.	Kham alu	2.00 qtl.	Do
30.	Bhaluksukti	3.00 qtl.	Do
31.	Rehera	10.00 qtl.	Do
32.	Bel chakar	2.00 qtl.	Do

Source: Annual reports of Jhargram Forest Division 2007 – 08, p. 22 – 23

9.2.1.3 Involvement of NAEB in the marketing of NTFPs

The National Wasteland Development Board (NWDB) was established under the Ministry of Environment and Forest in 1985 to increase forest cover in India. In 1992, the NWDB was split up and formed the National Afforestation and Eco-Development Board (NAEB) for the afforestation and rural development within a radius of 5 km of forest areas. There are seven Regional Centres of NWDB in India which came under NAEB in 1992. The Regional Centre of West Bengal has its office at Jadavpur University, Kolkata. The working area of the Centre

is stretched between three other states namely Bihar, Jharkhand and Sikkim and the union territory of Andaman and Nicobar Islands.

Initially, NAEB used to work with non-governmental organisations and voluntary organisations. From 1996, however, it has been assisting the Forest Department of West Bengal. The activities of NAEB are synchronized by the faculty members of the Department of Mechanical Engineering and the School of Water Resource Engineering (SWRE) of Jadavpur University. The Director of SWRE works as the Joint Coordinator of the Centre. The Regional Centre also receives support from other engineering departments, economics and social science departments and other allied departments of the University (Mazumdar, 2005).

Fig. 9.5: Group discussion with Scientists of Regional Centre (17-09-2008), NAEB, Jadavpur University, Kolkata

Photo: Ghosal, S.

The Regional Centre provides training on systematic harvesting and marketing of NTFPs to JFM members as well as Forest Department staff. They also work as the link between forest product harvesters and purchasers. They are not involved in the marketing of NTFPs directly. For the marketing of NTFPs, the Regional Centre arranges for NTFP-based trade fairs. Forest fringe dwellers can also sell their handmade cottage industry products at these fairs and marketing centres.

> "We [NAEB] are arranging '*Banaja Shilpa Mela'* [forest products based trade-fair] mainly to give exposure to forest folks to sell their collected and value-added forest products. It is happen in Jamshedpur (in the state of Jharkhand), an important industrial city of eastern India, as the location of this city is at the centre of the open dry-deciduous forest area of eastern India. There NAEB works as a linker between buyers and sellers. We also examine the demand of purchasers and based on that

> we discuss with actual collectors about quality, nature and type of products." (Director, NAEB, Jadavpur University, Kolkata, elite interview, 19th September 2008)

Under the 11th plan, the Regional Centre has recently launched a new model for the enhancement of Small and Medium Forest Enterprise (SMFE) in Potka block of East Singhbhum district in Jharkhand. For this purpose, about 1,000 tribal men and women were trained to undertake various activities, including Tassar cultivation for silk manufacturing, Lac cultivation, Grass and Bamboo-made decorative items for the promotion in national and international markets (Mazumdar, 2008).

The '*Banaj Shilpa Mela*' of Jamshedpur is conducted in collaboration with Kalamandir and the National Bank for Agriculture and Rural Development (NABARD). This gives good exposure to tribal villagers. During fairs, tribal forest fringe people can also meet several other government organisations and corporate sectors which can assist providing technology, financial aid through credit, insurance for social security and infrastructural development and marketing (Mazumdar, 2008).

9.2.1.4 Involvement of the JFM Wing, Ramakrishna Mission Lokasiksha Parishad in NTFPs marketing

The most renowned non-governmental voluntary organisation involved in NTFPs business in West Bengal is the JFM Wing of the Ramakrishna Mission Lokasiksha Parishad. The organisation has been working since 1981 – 82 for the socio-economic improvement of forest fringe dwellers, particularly living in dry-deciduous forests of Bankura, Purulia and West Midnapur districts.

> "At the initial level the greatest threat posed to environmental engineering that of ever increasing demand for timber, fuel wood, and fodder was catered by activities like development of eco-consciousness, methods of afforestation and other aspects of wasteland development. Substantial progress was made in this endeavour when about 1,000 hectare private owned wastelands in 60 villages of Purulia district was re-greened by planting 29,00,000 plants during 1987 to 11,993. This outstanding contribution of Lokasiksha Parisad was recognised by the Government of India by the presentation of the prestigious 'Indira Priyadarshini Vriksha Mitra' (IPVM) award in 1993." (Ganguly, 2001, p. 1)

Initially (in late 1980s), the Organisation used to work for the establishment of FPCs to minimize the gap between Forest Department and forest dwellers. The Forest Department of

West Bengal invited the Ramakrishna Mission Lokasiksha Parisad to "melt the ice" between forest dwellers and Forest Department. At that time, the Forest Department used to suspect forest villagers of illegal felling. On the other hand, forest dwellers used to consider that the forest was their own property so the Forest Department should not stop them from collecting forest products. That is why the State Forest Department realized that a third party [some welfare organisations such as Ramakrishna Mission Lokasiksha Parishad] was required to assist the establishment a good relationship between forest dwellers and the Forest Department.

The Ramakrishna Mission Lokasiksha Parisad mainly works to create awareness among forest dwellers about the importance of forest and forest products in human life and how these products can help forest dwellers to improve their socio-economic life. Thus, the Organisation works mainly as an advisory body rather than a marketing agency, otherwise forest dwellers may think that the Organisation is working in its own interest and not for forest dwellers. For this purpose, they have made some NTFP storage centres in Purulia, Bankura and West Midnapur districts. These centres are also used as marketing centres. These centres are run by FPC members and the Ramakrishna Mission Lokasiksha Parisad advises them about the scientific procedure of NTFP harvesting and how they can sell their collected products. Finally, if the Ramakrishna Mission Lokasiksha Parisad finds that forest villagers are in trouble regarding the marketing of their collected NTFPs, then they purchase these products and sell to city wholesalers or industrial units. These activities are carried out with the permission of the Forest Department (Ganguly, 2001, p. 1).

> "…*after collection Lokasiksha Parisad has to take permission from the State Forest Department to sell those products. Which products, how much and where the Organisation is going to sell, have to inform the Forest Department. Forest Department staffs come to check the collected products at the storage centres and decide if the product is saleable or not. They also measure the quantity of collected products and decide the royalty for the respective product. After paying the royalty then* Lokasiksha Parisad *can sell that product in the market or to the industrial units*." (JFM Wing, Ramakrishna Mission Lokasiksha Parishad, Ramakrishna Mission Ashrama, Narendrapur, group discussion, 16th September 2008, the medium of conversation was Bengali and English)

The informal marketing channels for NTFPs are well-established in the dry-deciduous forest areas of south-western part of West Bengal. Middlemen or mobile agents still control the majority of the NTFPs market. In the late 1970s, the State Forest Department took some initiatives to control middlemen so that actual collectors got a better price for their collected

products. For example, in Purulia district the Forest Department of West Bengal recruited some commission agents to collect Lac from actual collectors directly. In this way, forest villagers got a good price for their collected products. However, during the processing period, these commission agents mixed sand with Lac to increase the weight and then they sold the final product to the State Government. Thus, the commission agents cheated the State Government. The commission agents knew that the State Government would pay based on the total weight of Lac. After this incident, the system was stopped and the Ramakrishna Mission Lokasiksha Parisad was invited to become involved in Lac marketing in Purulia district.

Using their profit from NTFPs business, the Ramakrishna Mission Lokasiksha Parisad has built-up three community-based organisations at three different places in the dry-deciduous forest area with the help of forest villagers. These community-based organisations are registered with the Forest Department. These organisations have their own development funds. Thus, whatever the Ramakrishna Mission Lokasiksha Parisad earns from the marketing of NTFPs goes in the development fund of these organisations. In the absence of Ramakrishna Mission Lokasiksha Parisad, these organisations can continue their activities independently to regularise the marketing system of Lac, Tassar and medicinal plants in Purulia, Bankura and West Midnapur districts.

The Ramakrishna Mission Lokasiksha Parisad is also planning to develop a forum with the Indian Institute of Technology (IIT) Kharagpur, Vidyasagar University of West Midnapur district, National Institute of Science–Technology and Development Society (NISTADS) and the Indian Institute of Management (IIM) Kolkata for the establishment of grassroots level NTFP processing centres; where IIT Kharagpur will offer technology; IIM Kolkata will recommend strategy, Vidyasagar University will provide researchers and Ramakrishna Mission Lokasiksha Parishad will systematize the platform (Staff members, JFM Wing, Ramakrishna Mission Lokasiksha Parishad, group discussion, 16th September 2008).

9.2.2 Limitations of formal marketing channels

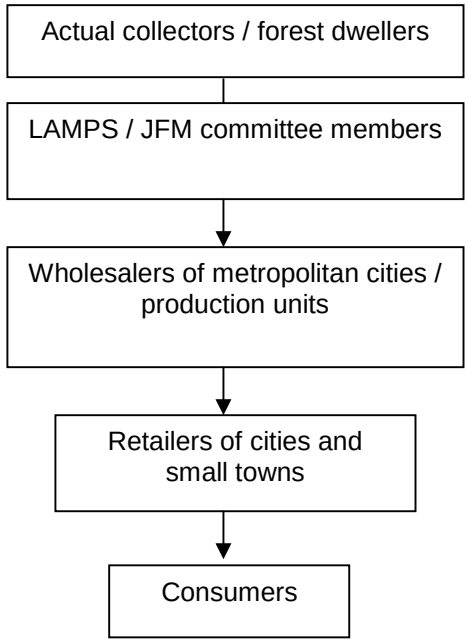
The main problem for the NTFP business is the variation in production from one season to another. According to the ADFO of Purulia Division, “the production of Amla is sporadic and collection fluctuates from one year to another. Therefore, industrial units cannot depend on a particular community for Amla” (semi-structured interview, 30th September 2008). If industrial units depend for a specific product on a particular community and if the community fails to supply the product, then the industrial unit will be in trouble. On the other hand, middlemen or mobile agents can manage the required amount of product by visiting several forests

communities. With the existing network and infrastructure, it is, however, not possible for the Forest Department or industrial units to contact each forest community directly to gather a large amount of such products.

> "…*if a few FPCs bring their collected products to our storage centres, then the amount will be quite good and then we can sell that bulk amount of product to the industrial units or city wholesalers. Thus, it is not possible to do marketing of NTFPs introducing any specific forest community to a particular industrial unit*." (JFM Wing, Ramakrishna Mission Lokasiksha Parishad, Ramakrishna Mission Ashrama, Narendrapur, group discussion, 16th September 2008, the medium of conversation was Bengali and English)

The supply chain of the NTFPs business is not well connected in the formal marketing channels compared to informal channels. It is quite simple and fairly straightforward (Fig. 9.6), but the gap between the steps is much wider than for the informal marketing channels. This is because the storage and marketing facilities needed at the grassroots level in the dry-deciduous forests of Purulia, Bankura and West Midnapur districts are not available.

Fig. 9.6: Trading channels of NTFPs through formal ways in West Bengal



Source: Ghosal, 2008, p. 89

With the decrease in forest area and the number of plant species, the availability of NTFPs is also falling. It is because of the uncertainty of the productivity, the Forest Department is not interested in getting involved in the marketing of NTFPs or in setting up any formal marketing

channels for other NTFPs, except Sal seeds and Kendu leaves (PCCF, Government of West Bengal, elite interview, 20th October 2008). Without destroying the resource base, forest dwellers are allowed to collect NTFPs for their daily household needs (resolution number 8554 - For Dated 15.11.1991). They may also collect certain amount of NTFPs to sell at the local market as well. The Forest Department, however, is not able to intervene in every NTFP business, especially if the amount of harvested product is small and irregular.

> "Government cannot intervene in every activity because in that case the cost of collection will go up very high. So we only want to intervene in those NTFPs which are grown in bulk and which are the major outturn from the forest areas." (PCCF, Government of West Bengal, elite interview, 20th October 2008)

Nevertheless, the knowledge-base regarding the harvesting of NTFPs is not well-organised in the State. The Forest Department cannot provide adequate information to industrial units, so that they can be assured about the supply of NTFPs. The Ranger of Jamboni range in Jhargram division of West Midnapur district (semi-structured interview, 10th December 2008) thinks, if some more government organisations (like LAMPS) were involved, then the problem might be solved to some extent.

For some NTFPs, the local demand is very high, but once the value-added product is made, then the local demand is reduced considerably because of the increasing price. Local people do not like to spend additional money for value-added products. In contrast, due to the distance of forest villages from the LAMPS or other organised marketing centres and the transportation problem, actual collectors prefer to sell raw NTFPs to middlemen or mobile agents.

> *"Except during the monsoon we collect Sal leaves for all round the year because during monsoon we cannot dry Sal plates. We sell Sal plates at the market. Most of the time mobile agents or middlemen come to our village to collect Sal plates. We had a Sal plate making machine also but because these plates are a little more expensive, the local demand for them is very low. Therefore, now we do not make machine-made plates, we stitch plates by hand and sell them. It is comparatively cheaper."* (Jamdaha villagers, Ranibandh range, Bankura districts, group discussion, 4th November 2008, the medium of conversation was Bengali and Santhali)

If forest dwellers get a well-organised permanent market for the machine-made plates, then obviously they will be interested in producing machine-made plates because these plates are more profitable. Forest dwellers do not have good contacts with formal marketing channels

or government organisations which are involved in the marketing of machine-made Sal plates. That is why they sell hand-stitched plates to mobile agents or middlemen. The Forest Department receives a good amount of funding from the State Government for various developmental schemes in forest areas but funds need to be spent with proper planning.

Forest dwellers think that if they come to the city or town market, then they might lose money in two ways. First, they will have to pay some money for transport and second, it is time consuming. The time they will spend in travelling and selling their collected products at organised markets could be used to collect more products from the native forest.

To influence forest dwellers sometimes mobile agents pay higher prices compared to government organisations and NGOs. Thus, they purchase the best quality products. After that, when Government authorised bodies come to purchase the same product, they get relatively poor quality products. When they go to sell these products to the industrial units or at the city market, they get lower prices or sometimes they cannot even sell these products. Mobile agents can change the rate they pay for NTFPs very quickly according to their requirements, but government authorised bodies cannot do so. Government bodies have to go through a long procedure before changing the rate for NTFPs. Villagers normally prefer to sell their collected products to those who pay the maximum price (Katiam villagers, Ranibandh range, Bankura districts, group discussion, 6th November 2008).

The DFO of Jhargram Division in West Midnapur district (elite interview, 28th November 2008) agreed that, "…at the beat or range level the Forest Department has no specific marketing policy or department for NTFP business till the date because it is difficult to control the whole system with the existing infrastructure… In Purulia, Bankura and West Midnapur districts forests are scattered and the transportation is not good enough. Several communities are living within the forests. Thus, from where, when and how much NTFPs forest dwellers will collect is very difficult to find out. It is very tough to trace each corner of the forest".

9.2.3 Approaches to overcome the limitations of formal marketing channels

The NAEB is trying to encourage the introduction of small and micro forest enterprises. Banks or other financial organisations do not like to take risks by giving credit to forest dwellers individually. The Government or banks, however, might be interested in giving loans to a community where several people will be liable to repay the borrowed amount. Thus, FPC members can form a cooperative society to obtain financial or technical assistance from

government and financial organisations. For this purpose, NAEB has already set up a marketing centre in Jamshedpur in collaboration with the NABARD.

> "City consumers cannot go to the remotest forest villages to purchase forest products. Therefore, a market system has to develop within the town area where it will be convenient enough for purchasers to visit quite often. The market must be well-decorated and the storage facilities should be enough so that actual collectors can keep their unsold products for time being. Rest-house for actual collectors, who are coming from far away, should also be there." (Director, NAEB, Jadavpur University, Kolkata, elite interview, 19th September 2008)

The involvement of institutions like WBFDC can also solve the organised marketing problem to some extent, as they already have infrastructure and networking at the grassroots level. The Managing Director of WBFDC believes (elite interview, 24th October 2008), "...if central level government organisations are unable to reach the forest villages, then they can approach forest dwellers through WBFDC. WBFDC is ready to work as a linker between actual collectors and central level organisations using the existing network… As WBFDC has already worked with FPC members for the timber felling so the Organisation has knowledge in forest products harvesting".

For the interior forests dwellers of Purulia, Bankura and West Midnapur districts, one of the most difficult problems for marketing NTFPs is the poor transportation system. The transport problem prevents forest dwellers getting to organised markets. Moreover, they consider that it is easier to sell their collected products to mobile agents or middlemen, who visit their village quite often, even if they receive a lower price. Thus, for the enhancement of formal marketing channels, it is necessary to improve the existing transportation system. Even it is not possible to connect every single interior forest villages to the district town, transportation at the block level could be improved.

The provision of convenient storage systems at the local level can also help to solve the limitation of formal marketing channels for NTFPs in the State. If forest dwellers can store their daily collected product at the storage centres, then they will have a good quantity of product that they can send to the town market or sell to industrial units. Thus, the Forest Department will also come to know about marketed products and actual collectors should get a better price. The Dakshinsol FPC committee members of Jamboni range in West Midnapur district mentioned (group discussion, 12th December 2008, the medium of conversation was Bengali), "...*although we get less price but we sell green [Sal and others] leaves because we cannot wait till the leaves dry, we need money. Most NTFPs are putrescent so we cannot*

keep them in our house for a while. Although, we know if we dry them and sell when the demand is higher, then for the same product, we will get a much higher price. If we get storage centre near our village, we can store our collected products there and later we can sell them at a better price".

The ADFO of Jhargram Division in West Midnapur district (semi-structured interview, 27th November 2008) felt that a cost-comparative investigation would be beneficial for the augmentation of formal marketing channels. Products that are cost effective could be identified. There would be no more than 30 species in dry-deciduous forests of west Bengal. For these 30 species, Forest Department can go for mass level harvesting in forest fringe areas and fallow lands with the collaboration of industrial units. Before going for mass-level cultivation, however, the Forest Department needs to identify some experimental plots as well as industrial units, who are interested in that particular product. Here, government authorised organisations have to take the initiative.

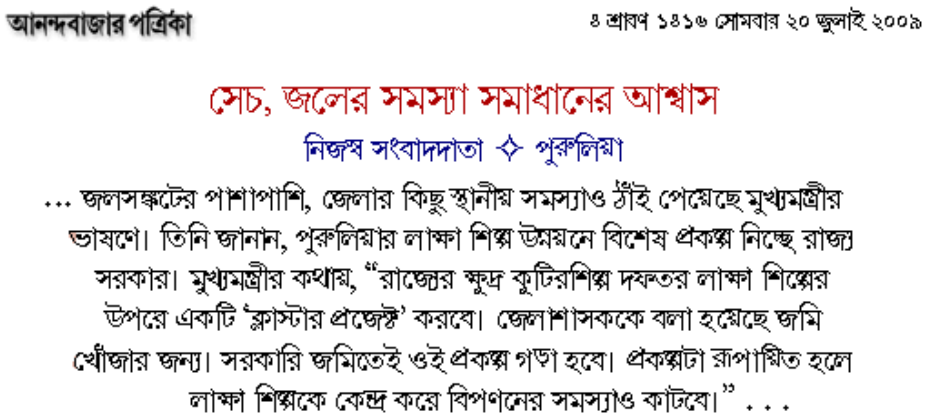
One of the staff members of the Forest Training Centre of Jhargram in West Midnapur district (semi-structured interview, 15th December 2008, the medium of conversation was Bengali) believes, "*once a market is developed for NTFPs, it will go by its own system with demand-supply chain. At the initial stage, however, it needs some captive market ... The expansion of proper marketing channels can break the present monopoly system of mobile agents. For this purpose, the genuine purchaser is needed who, if need, will work at the field level and according to the quality of product will pay to actual collectors on the spot. Without the positive cooperation of industrial units g*overnment organisations *cannot achieve the proficiency of formal marketing channels*".

From their field level experience, staff members from the JFM Wing of Ramakrishna Mission Lokasiksha Parishad (group discussion, 16th September 2008) realised that a good network with forest villagers as well as industrial units is the most important way to strengthen the formal marketing channels of NTFPs in the State. Ramakrishna Mission Lokasiksha Parishad does the marketing of NTFPs seasonally, and sells the collected product as soon as possible. They then go for the next available product. For this purpose, first they consult with forest dwellers and then they look for a purchaser. Thus, they try to make the most efficient use of their existing warehouses. However, they are worried about the increased financial risk as they may not be able to fill the storage centres efficiently.

The active involvement of more government authorised NGOs and voluntary organisations with the Forest Department can promote the organised marketing channels, providing a higher price to actual collectors. For example, if Ramakrishna Mission Lokasiksha Parishad

collects NTFPs on a regular basis paying the actual market price, then mobile agents or middlemen will be compelled to pay the market price. Otherwise, forest dwellers will not sell NTFPs to middlemen. The active involvement of NGOs and government organisations will create additional markets as well as awareness among forest dwellers about the importance and price of their collected NTFPs (Fig. 9.7).

Fig. 9.7: Measures are taken by the West Bengal state government for the enhancement of Lac industry and marketing in Purulia district



আনন্দবাজার পত্রিকা ৪ শ্রাবণ ১৪১৬ সোমবার ২০ জুলাই ২০০৯

সেচ, জলের সমস্যা সমাধানের আশ্বাস

নিজস্ব সংবাদদাতা ✧ পুরুলিয়া

... জলসঙ্কটের পাশাপাশি, জেলার কিছু স্থানীয় সমস্যাও ঠাঁই পেয়েছে মুখ্যমন্ত্রীর ভাষণে। তিনি জানান, পুরুলিয়ার লাক্ষা শিল্প উন্নয়নে বিশেষ প্রকল্প নিচ্ছে রাজ্য সরকার। মুখ্যমন্ত্রীর কথায়, "রাজ্যের ক্ষুদ্র কুটিরশিল্প দফতর লাক্ষা শিল্পের উপরে একটি 'ক্লাস্টার প্রজেক্ট' করবে। জেলাশাসককে বলা হয়েছে জমি খোঁজার জন্য। সরকারি জমিতেই ওই প্রকল্প গড়া হবে। প্রকল্পটা রূপায়িত হলে লাক্ষা শিল্পকে কেন্দ্র করে বিপণনের সমস্যাও কাটবে।" ...

Translation

The Chief Minister of West Bengal has expressed his anxieties over the irrigation crisis as well as over some other local problems of Purulia district. He informed that the State government is taking some major initiatives for the development of Lac industry of Purulia district. According to Chief Minister, the Ministry of Small and Cottage industries will make a 'cluster project' on Lac industry. The District Magistrate of Purulia district has been asked to locate the land. The project will be made on government land. Once the project starts, the problem of Lac marketing will last no more in Purulia district.

Courtesy: Ananda Bazar Patrika (a Bengali daily news paper), July 20, 2009 (Translated by the Researcher)
http://www.anandabazar.com/20raj6.htm

The association of NGOs and government organisations can empower forest dwellers. They can find out about the market potential of their collected NTFPs and can therefore bargain before selling their products. Nowadays, some forest dwellers keep their collected products in their house if they do not need money urgently. They sell when they can get a better price. Earlier, they were afraid to store their collected products (especially which are perishable). Now the situation has changed to some extent so they can wait for government authorized purchasers to sell their products at the proper price. They even send their community members to the forest office to discover the up to date market price of NTFPs.

The ADFO of Jhargram Division in West Midnapur district believed (semi-structured interview, 27th November 2008) that to enlarge formal marketing channels for NTFPs, the process must be done in three phases. First, NTFP species have to be identified which can be produced locally in sufficient quantity for marketing purpose. Second, a conversation with a permanent and genuine purchaser is needed. Then demand and supply can be

determined. Between these two steps, there is another intermediary step, that is the Forest Department has to make forest dwellers aware about the systematic harvesting strategy, keeping in mind their socio-economic condition, their feeling about the forests and their indigenous knowledge.

9.3 NTFPs and the informal marketing channels

Forests are the most important source of natural resources in Purulia, Bankura and West Midnapur districts. The rural population, including tribal forest fringe people depend considerably on forest resources for their domestic as well as commercial purposes (Appendix 3). With the implementation of forest policies and the nationalisation of some forest products, forest dwellers' rights on NTFPs collection were checked (Forest Survey of India, 1985). Nevertheless, considerable amounts of forest products are still being collected from the local forests of these three districts without official permission. These products are also marketed through informal marketing channels by middlemen and mobile agents. Thus, on the one hand, the Forest Department loses revenue; on the other hand actual collectors are also exploited.

> "Forest is the most important natural resource of the [Purulia] District. The rural population rely heavily on the forests for meeting their day to day needs of fuel wood, fodder for their cattle and also partly for earning their livelihoods. The rural population, specially the tribals, during the period of private ownership of forests enjoyed rights and privileges over the forest produce in the neighbouring forests through which they use to meet their needs. ... Collection and subsequent sale of produce like Sal seeds, Sal leaves, Kendu leaves, Mahua fruits and flowers, Tassar etc served as sources of auxiliary income." (Forest Survey of India, 1985, p. 16)

For certain products in informal marketing channels, where the price is well-known to actual collectors, mobile agents pay the appropriate price. For most products, however, actual collectors do not get the correct price. Even forest dwellers do not know the actual price for these products, so middlemen take the opportunity to make excessive profits (Founder Chairman of IBRAD, elite interview, 18th September 2008).

Fig. 9.8: Forest fringe dwellers selling firewood, Sal sticks (used as toothbrush) and wild vegetables at the Arsha local market of Purulia district (22-09-2008 – 15-10-2008)

Photo: Ghosal, S.

Although, for most NTFPs middlemen pay in rupees, there are some interior forest villages where middlemen pay for some NTFPs with commodities. This shows that the barter system still prevails there. Even then, forest dwellers are compelled to sell their collected NTFPs to middlemen from their village or at the local market to save transport cost and time (Fig. 9.8 & 9.9). In most cases, the prices of NTFPs are decided by local merchants according to demand.

Fig. 9.9: Marketing of NTFPs by forest villagers at Ranibandh local market, Bankura district (25-10-2008 – 11-11-2008)

Photo: Ghosal, S.

In general, forest dwellers are afraid to visit town or city markets. An unknown apprehension exists among these communities regarding the selling of NTFPs at town or city markets. In the informal marketing channels, actual collectors mainly sell their collected products to mobile agents or middlemen, then mobile agents sell the product to local merchants and finally local merchants send them to city wholesalers or industrial units for further processing

and marketing (Fig. 9.10). Thus, in this system, NTFPs are supplied from actual collectors to ultimate purchasers through a number of media (Fig. 9.11).

> *"If we would sell individually after going to town then we might face problem but what we do is just collect NTFPs from the forest and sell to local merchants in the village, so we haven't faced any problem."* (Kendua Villagers, Jamboni range, West Midnapur districts, group discussion, 14th December 2008, the medium of conversation was Bengali)

Fig. 9.10: Local wholesaler exporting Sal plates from Jamboni village of West Midnapur district to the city market (left); roots are sold at the Midnapur town, the District town of West Midnapur (15-11-2008 – 20-12-2008)

Photo: Ghosal, S.

9.3.1 Reasons behind the presence of middlemen and mobile agents

There are several reasons behind the presence of middlemen in NTFP marketing channels in dry-deciduous forests of Purulia, Bankura and West Midnapur districts. Although the Forest Department as well as authorised organisations know about the involvement of middlemen and the exploitation of actual collectors by them, they find it impossible to eliminate middlemen completely from the system. This is because the Forest Department cannot make a comprehensive chain for the marketing of all NTFPs with its present infrastructure. There are thousands of forest fringe villages in these three districts and the transport system for these villages is not good. Therefore, actual collectors cannot go to sell their daily collected products at organised markets at the block or district level. It is also not possible for the Forest Department to collect NTFPs from each forest village daily. In this situation, middlemen solve the problem to some extent, being a part of the bridge between actual collectors and consumers (Founder Chairman of IBRAD, elite interview, 18th of September 2008).

The Managing Director of the West Bengal Forest Development Corporation (WBFDC) thinks that (elite interview, 24th October 2008), these middlemen solve the network problem to some extent. As they are predominantly from forest fringe villages, they have good contacts with villagers as well as with local merchants. Therefore, they can take the risk of giving advances to actual collectors to supply NTFPs to them; something which outsiders cannot do. Middlemen create markets for NTFPs, available in the local forest. Thus, lots of information has already been generated regarding the availability, quantity and demand of NTFPs found in native forests. In several cases, only after the formation of markets by middlemen have government authorized marketing agents come to know about the scope and potential for profit of NTFP markets. Forest dwellers also feel comfortable about working with middlemen as they are, in most cases, from the same background.

The Conservator of Forest, Working Plan & GIS, Department of Forest, Government of West Bengal (semi-structured interview, 22nd October 2008) strongly supports the presence of middlemen. According to him, "who said to stop middlemen ...now-a-days the Forest Department is talking about public-private partnership (PPP). Therefore if anybody says (about the elimination of middlemen) then they are living twenty years back...." Due to the lack of proper communication and transport systems, the presence of middlemen becomes more important in the system and if the Forest Department tries to remove these people then that will adversely affect the entire system.

The ADFO of Bankura South Forest Division in Bankura district believes that tribal people do not know how to go Kolkata or city markets where they have to sell their collected products. Some forest villages are very far even from the district town. Forest dwellers also do not know about government rules and regulations regarding the marketing of NTFPs. Therefore, the Forest Department allows some agencies and permit holders to collect NTFPs from forest villagers to sell these products to industrial units, but this is not enough. Middlemen or mobile agents are needed to supply to industrial units.

> "Bankura town is about 60 km away from Ranibandh, from where maximum NTFPs are collected in the District… tribal people do not get bulk amount of products at a time to sell at the Bankura town or to the industrial units. That is why, through mobile agents they sell their collected NTFPs. Mobile agents visit several villages everyday to make a good amount of product so that they can make some profit selling at the town market." (ADFO, Bankura South Forest Division, semi-structured interview, 7th November 2008)

Unless social enhancement and awareness is developed, pressing subsistence concerns dictate that forest dwellers are not able to think beyond a certain limit in the context of the importance of forest ecology and the eco-chain in human life. Middlemen have an important role in this kind of society where there is no immediate access to the market and a lack of marketing information and knowledge. For illiterate forest villagers, middlemen can often be seen as a saviour.

> "*Forest Department do not buy anything from us. LAMPS centre is also far away from our village, they only purchase Sal seeds, and Kendu leaves. Therefore, to sell other products we have to depend on middlemen. We don't have any other option.*" (Jamdaha villagers, Bankura district, group discussion, 4th November 2008, medium of conversation – Bengali and Santhali)

The Forest Department can afford knowledge, information and technology, but they cannot provide a permanent assured market, because the marketing of NTFPs is a very tedious job due to the variations in production (Conservator of Forest, Research and Development Wing, Department of Forest, Government of West Bengal, semi-structured interview, 12th November 2008).

The ADFO of Purulia Division in Purulia district assumes (semi-structured interview, 30th September 2008) that at the micro level, the quantity of NTFP collected on a daily basis is very small. Thus, formal marketing channels have not been developed at the village or Panchayat level. For example, a forest dweller from Ajodhya hill area may collect two or three kilos of some NTFPs in two-three days. Now, if he goes to the organised market in Purulia town, which is about 40 km away, then it would not be beneficial for him because he would spend most of the value of the NTFPs on bus fare to get to the Purulia town market. It is, therefore, preferable for him to sell to middlemen. If middlemen pay the market price, then there should not be a problem. It is good for villagers because they can save their time and transportation cost.

> "*If we get the market price from middlemen or mobile agents, we do not go to the town market. We just sell our collected NTFPs to them at the local market or from our village. If we do not get the actual price then we are disappointed. Even then we are compelled to sell them for certain reasons such as we do not have any idea about the town market and for some products there is no demand in the village and we have to spend time to go market."* (Katiam villagers, Ranibandh range, Bankura districts, group discussion, 6th November 2008, the medium of conversation was Bengali)

The PCCF, Government of West Bengal (elite interview, 20th October 2008) pointed out that in a free society, where trade of NTFPs is authorised to some extent, then the role played by middlemen cannot be ignored. Most NTFPs are not 'nationalised' like Kendu leaves and Sal seeds. For nationalised NTFPs, the Forest Department does not permit middlemen to be involved in marketing. In the case of other NTFPs, they can do harvesting without destroying the resource base. The Forest Department should monitor middlemen on a regular basis so that actual collectors are not exploited by them.

The interviews show that the big industrial units would like to obtain the best quality products. They pay according to the quality of the products, but in most cases, forest villagers are not aware about grading. Somebody has to guide forest dwellers how to grade their harvested products according to quality. The grading varies from one industrial unit to another for the same product. The grading also varies with market demand and specification. In most cases, forest dwellers mix-up all their collected products which affects the marketing price adversely. Middlemen sometimes, when they do not get enough time to grade the product, instruct forest dwellers to do so. Thus, the knowledge of grading could be distributed among forest communities and this knowledge could help forest dwellers to get prices that are more appropriate.

The Vice President of West Bengal Consultancy Organisation (WEBCON) assumed (semi-structured interview, 31st October 2008) that district level dealers prefer to collect NTFPs from middlemen or mobile agents as it is not even possible for them to visit every forest village. They sometimes even appoint middlemen or mobile agents at the village level for a continuous supply of NTFPs. As a result, a number of mobile agents are working in these districts as employees of district level wholesalers or industrial units.

These middlemen follow different ways to manage NTFPs from villagers at the earliest stage of the season. Occasionally, they even pay a higher price than government authorised bodies to convince forest dwellers to sell. Sometimes they even threaten forest dwellers. When middlemen pay a higher price, they take the best quality products. The Assistant Managing Director of WBTDCC said (semi-structured interview, 16th September 2008, medium of conversation was Bengali), "...*it is easier for middlemen to visit several forest communities and to discover the best quality products. A government organisation cannot do so because of the inadequate infrastructure and work force. Now, if the organised sector purchases the medium or low quality product, it will be very difficult to sell that product*".

The ADFO of Jhargram Division in West Midnapur district thinks that (semi-structured interview, 27th November 2008), "an emotional factor still works among forest communities. If

they continue to supply NTFPs to middlemen, it will remain very difficult for them to move towards organised bodies. They love to follow their traditional practices… This is partly because of illiteracy and a lack of awareness". Sometimes, even if they get a good price from an organised body, they do not feel comfortable about working with it. Therefore, until and unless they are aware about harvesting procedures, marketing and profit, it is very difficult to improve systematic marketing channels.

9.3.2 Exploitation of actual collectors by middlemen

Although, middlemen and mobile agents have an important role in the marketing of NTFPs, collected from the dry-deciduous forests of West Bengal, there are some adverse effects of their presence in the system. In some cases, middlemen take advantage of forest dwellers' diffidence. They do not bother about their unscientific harvesting methodologies. They convince forest dwellers to collect NTFPs at the early stage of the season, which is not good for the sustainability of the species. "Middlemen do business for their own profit, therefore, they do not care about the conservation of plant species for future" (Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region, elite interview, 21st October 2008).

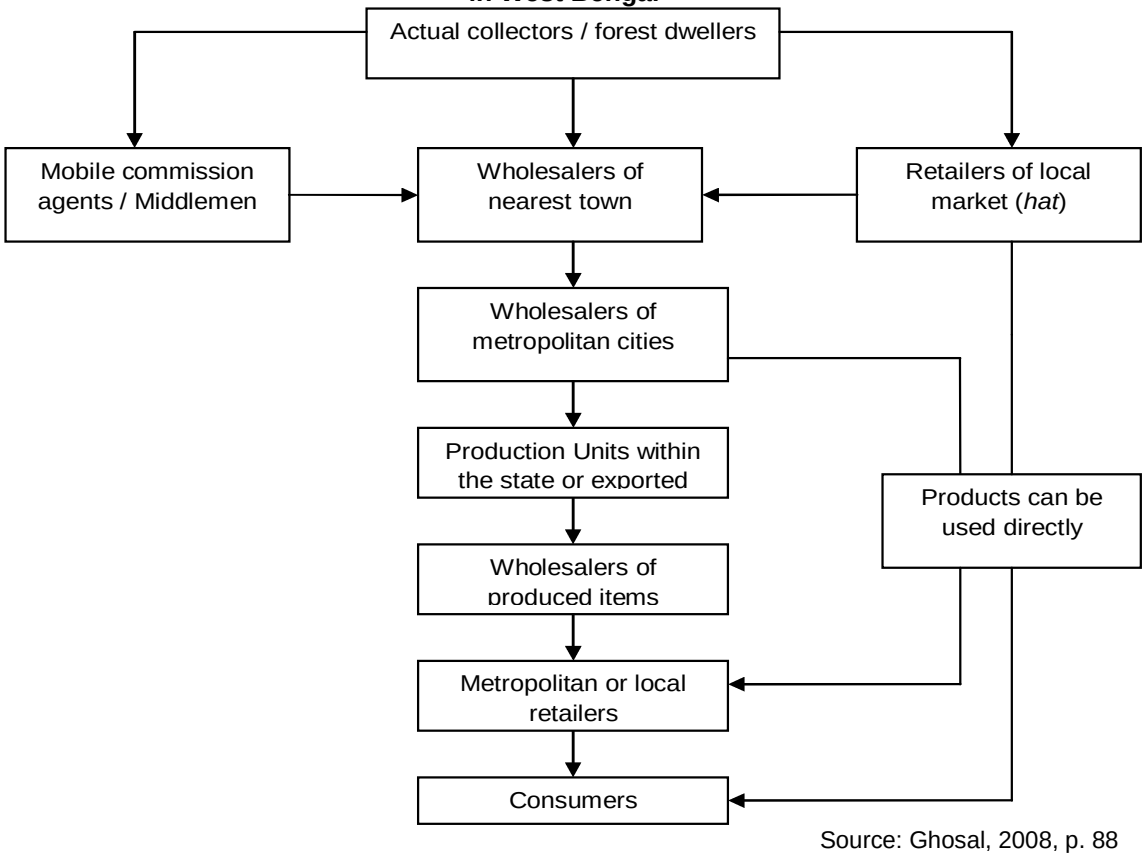
In general, middlemen try to pay actual collectors the minimum price for their collected NTFPs. For this purpose, they have several excuses to forest dwellers. When they sell NTFPs to the town wholesalers or to the industrial units, they keep the price as high as possible. This is a well-known fact in the research area. The State Forest Department, therefore, is planning to develop some form of control over the middlemen-dominated business so that actual collectors get a proper price. However, if the quantity of the product is not adequate, then it would not be cost effective to establish the authorised bodies (APCCF, Govt of West Bengal, elite interview, 23rd October 2008).

> *"No. They (middlemen) never pay us the correct price. They always try to make as much profit as they can. When a few mobile agents or middlemen come then only we get to know the correct price. And then whoever pays us the best price, we give him our collected products. If more people come to collect the same product, then we can realize that the demand for that product is higher at the market so we try to get a better price from them*." (Shushni villagers, Jamboni range, West Midnapur districts, group discussion, 15th December 2008, the medium of conversation was Bengali)

It is generally agreed that middlemen never support actual collectors to stand on their own feet. If forest dwellers become more aware about the importance of their collected products,

accurate market prices, market demand and regular purchasers then they might not sell their collected products to middlemen. Therefore, middlemen prefer lack of information, poor transportation and illiteracy among forest communities so that they can continue their business. The ADFO of Bankura North Division in Bankura district (semi-structured interview, 7th November 2008) thinks, "...middlemen should be eradicated. They are just like weed. Though weed is a vague term but what we understand by weed they are the real weed. They are stand-in just like a hurdle on the way of forest dwellers socio-economic development". Because of the involvement of middlemen and mobile agents, NTFP marketing chains become longer (Fig. 9.11) which reduces the profit of each group involved in the chain. Actual collectors and forest dwellers suffer the most in this system, as their bargaining power is less because of their poor economic condition.

Fig. 9.11 Supply channels of NTFPs, in informal ways, from actual collectors to consumers in West Bengal



Source: Ghosal, 2008, p. 88

Every year, some businessmen from Kolkata visit the dry-deciduous forests of Purulia, Bankura and West Midnapur districts in the month of September to collect Kalmegh (*Andrographis paniculata*). They believe that the quality of Kalmegh leaves is better before flowering. This is, however, not the best time for Kalmegh harvesting, which should be collected two or three months later when seeds have fallen. The businessmen that come earlier to collect Kalmegh pay Rs 1 or 2 for a kilo of Kalmegh to actual collectors. Thus, they are helping to destroy the resource base. Forest dwellers collect Kalmegh for these

middlemen just to have some money in advance. One more factor is, during this period (September – October), villagers also face financial problems because of the previous year's crops have tended to run out so they are keen to get whatever price they can from these businessmen. Staff member at the Forest Training Centre of Jhargram in West Midnapur district remarked that (semi-structured interview, 15th December 2008), "...during the month of October – November there are some of forest communities festivals, so forest dwellers need money and businessmen take this opportunity. At Kolkata these businessmen sell the same Kalmegh at a very high price".

In Bankura district, the exploitation of forest villagers within the Babui rope business is also noticeable. Local demand for Babui rope is comparatively less than some other states of India, so middlemen are involved in the business and take the opportunity of little demand at the local level. The storage system is inadequate to support the total amount of harvested Babui grass. The WBTDCC is planning to be involved in the business, but they do not have specific storage or marketing centres for the product.

> "Both male and female members of tribal families of south Bankura are efficient in making Babui [grass] rope which has a steady demand in the markets within the State, as well as in other states like Uttar Pradesh and Rajasthan. But, in absence of local market facilities, the middlemen dominate which leads to deprivation of *[the]* growers of competitive price." (Development and Planning Department, Government of West Bengal, 2007, p. 56)

In most cases, representatives of pharmaceutical companies prefer not to purchase medicinal herbs from actual collectors directly. The marketing staff of these companies prefer to obtain products through middlemen, as it creates the opportunity for them to get some commissions from middlemen, mobile agents or village level wholesalers. If any government organisation was involved, then they would have to pay a higher price. However, these marketing agents tell their companies that they have paid actual collectors the market price. Thus, they make a good amount of money each year. Thus, they deceive collectors who do the actual backbreaking job of collecting NTFPs.

> "*It is just taking advantage of a socio-economically deprived community. Whatever the agents from industrial units, local merchants and middlemen decide that will be the price for these medicinal herbs; whereas, even if those people who are collecting sometimes risk their lives, they do not have any right to decide the price of their collected products."* (Staff member, Forest Training Centre, Jhargram, West Midnapur district, semi-structured interview, 15th December 2008)

In the interior forest villages, the barter system is still prevailing for a few products. According to Jamdaha villagers in Ranibandh range of Bankura districts (group discussion was conducted on 4th November 2008, the medium of conversation was Bengali and Santhali), "*middlemen collect Sal seeds from us. For that they pay in salt. Mobile agents or middlemen give us a kilo of Salt and take a tin (box) of Sal seeds. A tin contains 10 kg of seeds. … Sal seeds are used as an industrial raw material, including for the production of oil, soap and some other cosmetics. The market price of Sal seeds is much higher, however, we do not get money for it, we get salt only. It is just like a tradition or custom in our society".*

Middlemen or mobile agents sometimes wait for villagers on their way to local market. When forest villagers go to sell their collected NTFPs, middlemen purchase from them. Forest villagers sell their products on the way, instead of going to the local market, because they are not sure whether they would be able to sell all their products at the local market or not (Forest Guard, Ranibandh range, Bankura district, semi-structured interview, 4th November 2008). Whereas, middlemen, if they cannot sell the whole product at the local market, can also go to the town market or district level wholesalers to sell the product. Middlemen take advantage of insecure NTFP marketing systems. If forest dwellers were to be assured about the market for their collected products, then they would not give their products to middlemen at a nominal price.

The villagers of Katiam village in Ranibandh range of Bankura district said (group discussion, 6th November 2008, medium of conversation was Bengali and Santhali), "*if production is adequate then they get a lower price from mobile agents, middlemen or NGOs, even if the product has multiple uses. Conversely, if production is less then they get comparatively better prices*". Therefore, the price also depends on the availability of the product. Normally, middlemen try to collect NTFPs in raw form from actual collectors and then they do the processing and grading of the product. Before value-addition, middlemen pay a very low price to forest villagers for their collected products. After value-addition or processing, whereas, the price of the product increases significantly.

9.3.3 Measures to control the informal marketing channels

According to the Director of the Regional Centre of NAEB, Jadavpur University (elite interview, 19th September 2008), a large proportion of these middlemen or mobile agents are themselves from the native forest villages. Thus if the government remove these people from the system, these people would also suffer. The problem could be solved if this informal marketing channels are systematised. Through organisation, the adverse influence of middlemen could be reduced and, at the same, the eradication of middlemen would not be

required. A small number of middlemen or local merchants, who live at the nearest town, are economically well-off and they make a profit when they purchase products from the village level middlemen. Therefore, through the systematisation of informal NTFP marketing channels, actual collectors could be saved from exploitation by middlemen. This systematisation could be done by involving beat or range level forest staff and other government authorised bodies who have knowledge of forestry (Katiyar, 2007).

The Forest Department of West Bengal has a plan to encourage FPC members in the cultivation of those medicinal plants, which already have a ready market. This cultivation of medicinal herbs can be undertaken on government fallow land because a large amount of uncultivated barren land is available in these three districts. As the marketing of NTFPs is a tricky job, the Forest Department is emphasising those products which have good market demand and for which the harvesting procedure, market price and confirmed purchaser are known by forest dwellers. This will reduce the dependence on middlemen and even if middlemen are involved in the business of these products, they cannot mislead actual collectors (PCCF, Government of West Bengal, elite interview, 20th October 2008).

The Managing Director of the WBFDC believes that most of the forest villagers are collecting and marketing NTFPs individually, so they cannot bargain with middlemen. Their individual amounts of collected NTFPs is also small. However, if they unite and make a communal body, such as a cooperative, then they can protect their rights. A group of people can collect products, another group can store and process and others can sell at the organised market. Thus, the presence of middlemen can be controlled. The Government gives quite a few incentives to cooperatives or communal bodies rather than individuals.

> "…together they [forest dwellers] can find out good purchasers, bargain for better price, can contact with experts to train them on scientific way of harvesting, processing, making of value-added products etc." (Managing Director of WBFDC, elite interview, 24th October 2008)

To reduce exploitation by middlemen, the JFM Wing of Ramakrishna Mission Lokasiksha Parishad has increased the price level of some NTFPs. Therefore, forest villagers are now confident that if middlemen or mobile agents do not purchase the product at the market rate, then Ramakrishna Mission will purchase the product and they will get an accurate price. On the other hand, middlemen have a good network with industrial units or city wholesalers already, so they try to pay the proper price to forest villagers for the continuation of their business. The number of storage and marketing centres set up by the Ramakrishna Mission is low compared to the number of forest villages and the total amount of NTFPs collected

every year. Therefore, there is an urgent need to involve more NGOs or voluntary organisations in the system to enhance such activities (JFM Wing of Ramakrishna Mission Lokasiksha Parishad, group discussion, 16th September 2008, the medium of conversation was Bengali and English).

When forest villagers do not get enough money selling their collected product, then they try to collect more products to fulfil their financial requirements which causes over-exploitation of forest resources. To resolve this problem, collectors need to know the actual market prices of NTFPs (Katiyar, 2007). This can be done using media, through the Forest Department, Gram Panchayat and other government offices. If the price difference from raw products to final products or value-added products becomes clear to forest dwellers, then they will be interested in producing more value-added products, rather than selling the raw product which will reduce over-collection of NTFPs as well as the influence of middlemen in NTFP marketing. However, for this purpose, a ready market is needed so that forest villagers can sell their products on a regular basis. Involvement of more organised bodies and formation of cooperative bodies (self-help groups) can be supportive in this regard.

> "Each stage, from Sal leaf to *siapata* (hand-stitched Sal plates) to plate, involves value-addition and the maximum value-addition takes place in the process of making Sal plates. Unfortunately, the traders and commercial entrepreneurs dominate in this last stage of value addition. A shift in this arena is being attempted through empowerment of the self-help groups." (Development and Planning Department, Government of West Bengal, 2007, p. 56)

9.4 Dichotomy between formal and informal marketing channels

The price of NTFPs has increased considerably since the involvement of WBFDC, WBTDCC and some other NGOs and government organisations.

> "It should be noted that increased prices of non-timber produce are not automatically translated into higher prices received by tribal collectors because of extremely imperfect markets which were dominated by middle men. The FDCs were thus asked to play a role of benevolent manager of non-timber forest resources for the benefit of tribal collectors. The creation of the [Forest Development] Corporations has benefited the poor and helped them to bargain better due to presence of a floor price announced by the FDC before the beginning of the collection season." (Tewari, 2006, p. 284)

Although a large number of forest dwellers have already moved to other jobs (such as daily wage labourer, farming, dairy and cottage industries and formal sectors) and many others consider forest product collection as secondary job, even then, NTFPs have tremendous scope for income generation among unemployed forest people. Formal marketing channels for NTFPs are slowly developing in the dry-deciduous forest area of West Bengal. New markets for new products are being discovered through the active collaboration of forest dwellers, NGOs, government organisations as well as middlemen (Rao, 1997).

The exploitation of forest dwellers by middlemen is a well-known fact in the dry-deciduous forest area of West Bengal. However, with the existing infrastructure the Forest Department, WBFDC, WBTDCC and NGOs cannot market all NTFPs harvested annually in the research area. Therefore, the presence of middlemen is also important. A parallel business to the formal marketing channels is very active in the State for the marketing of various NTFPs. The critical factor is to encourage collaboration between these two marketing channels (ADFO, Bankura North Division, Bankura district, semi-structured interview, 7th November 2008).

The APCCF, Government of West Bengal (elite interview, 23rd October 2008) believes that Government measures cannot be enough in the present socio-economic condition of forest dwellers for the organised marketing of NTFPs. Forest villagers also have to take noteworthy initiatives in this regard. When local merchants or middlemen ask forest people to supply NTFPs, then forest dwellers must inform the nearest forest office. Thus, the Forest Department will come to know which products, how much and from which area is being collected and who is going to purchase that product. This will also help forest dwellers to secure the appropriate price. Even if middlemen are needed due to the lack of government authorised marketing bodies, forest officers can advise forest dwellers as well as middlemen regarding the harvesting procedure, storage, processing and marketing for the collected NTFPs.

It is important to reveal that, although several initiatives have been taken by government organisations, NGOs and voluntary organisations, the informal marketing channel remains the stronger of the two channels. This is because the informal channels, acting in the forest fringe areas or remote areas, do not always work against the interests of actual collectors. For example, actual collectors sometimes complain that the price they are getting from the formal sector is less than the informal sector. This is because government authorised bodies always pay the standard price, which is not flexible, whereas in informal marketing channels the price fluctuates according to demand and supply of the product (ADFO, Purulia Division, Purulia district, semi-structured interview, 30th September 2008).

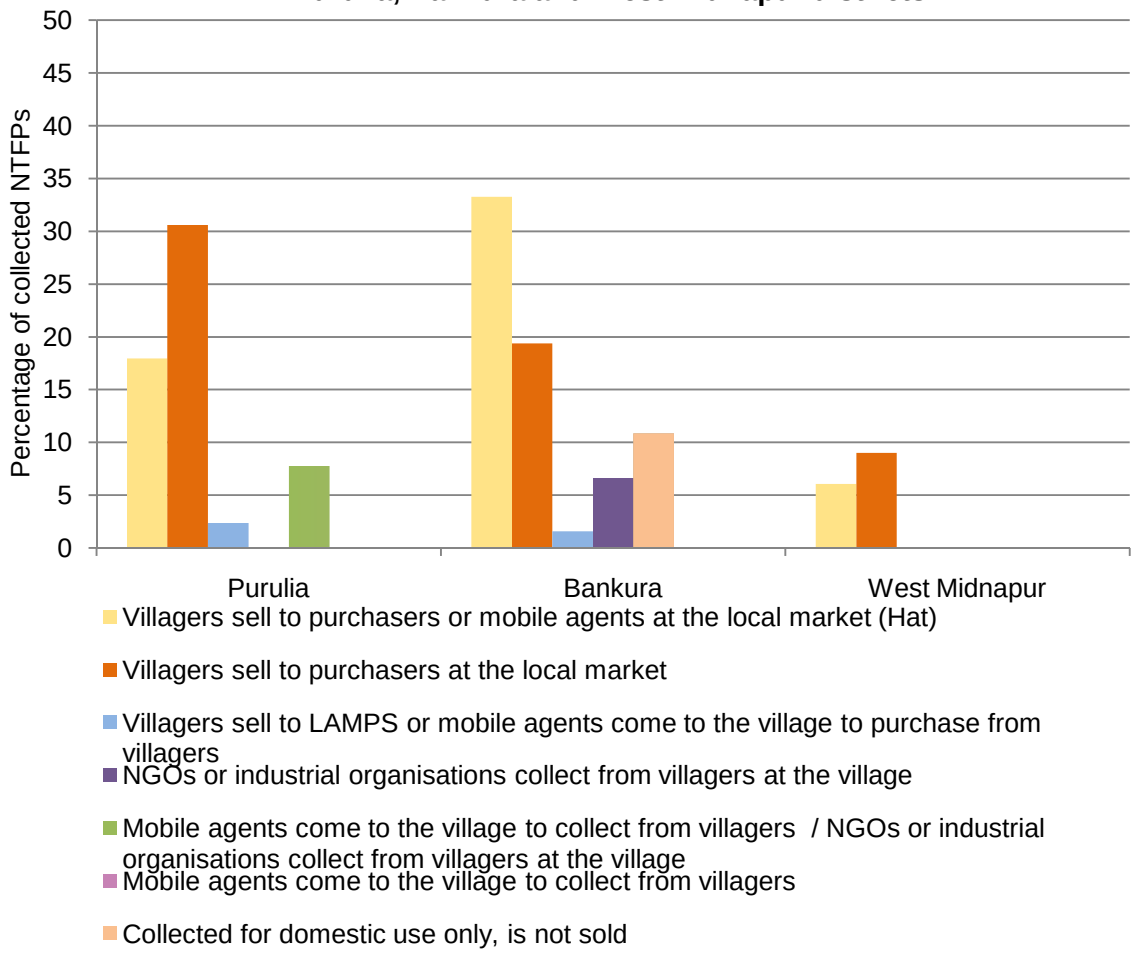
The organised storage and marketing centre is sometimes quite far away from the remote forest villages. That is why, even if, actual collectors get a lower price from mobile agents, they often prefer to sell their collected products to middlemen from their home or at the village market. Government agencies (excluding LAMPS) have the greatest access at the district level, not at the Gram Panchayat or Block level. Thus, in most cases, actual collectors do not make contact with genuine purchasers, who will pay accurate prices and purchase NTFPs on a regular basis.

In socio-economic terms, most forest villagers have an income of less than $1 US per day and are constantly striving to meet their subsistence needs. If there are taboos or faith in someone, then it is hard to change. To this end, education could play an important role. Through primary school education, awareness about the importance of forests and forest products in human life could be increased. Sometimes, forest villagers treat middlemen as their saviour, because in most cases middlemen bring information to villagers and create a market for them. Thus, without the set up the organised marketing channels at the grassroots level, the entire system could collapse if middlemen are removed (Conservator of Forest, Research and Development Wing, Department of Forest, Government of West Bengal, semi-structured interview, 12th November 2008).

Some NTFPs have good market demand in other states or even in some other countries. Therefore, for these NTFPs, some specialised national level agencies, such as the Medicinal Plant Board, are needed. Thus, the exploitation of informal marketing channels can be reduced, at the same time the marketing of these products will continue. Without the involvement of some more agencies, such as WBTDCC, WBFDC, Ramakrishna Mission Lokasiksha Parisad, there will be an adverse effect on forest livelihoods if middlemen are removed from the present system. There are some NTFPs (such as Sal leaves), which are harvested throughout the year and they have a good market demand. However, no government authorised body is involved in the marketing of these products. Existing government authorised bodies, which are already involved in the timber business, or some new organisations could participate in the marketing of NTFPs. They could even use their existing infrastructure, technologies as well as the network of middlemen.

> “It might, therefore, be more prudent to have an organisation, such as LAMP (Large-scale Multipurpose Cooperative Society), which is already involved in the production of various other forest produce to also take up the machine-made Sal plate industry. Although this organisation has been set up only for tribals, they can be requested to expand their operations for the benefit of both tribals and non-tribals.” (Dutta and Adhikari, 1998, p. 149)

Graph 9.1: Percentage of collected NTFPs sold in different ways in Purulia, Bankura and West Midnapur districts



Source of data: Based on questionnaire survey

Although, it is a well-known fact that most of the time, in middlemen-controlled businesses, actual collectors get very little remuneration for their strenuous work, unless and until Government changes the present policy, it is very difficult to reduce the awkward effects of informal marketing channels because villagers have no other realistic method of selling their collected products. As their economic condition is barely above subsistence level, they cannot wait long for an organised marketing system (DFO, Jhargram Division, West Midnapur district, elite interview, 28th November 2008). That is why, in Purulia, Bankura and West Midnapur districts, maximum NTFPs are still marketed through informal channels (Graph 9.1).

To collect a few NTFPs, mobile agents visit forest villages, whereas other products are purchased from the local market. Local markets are usually open once or twice a week. From there, neighbouring villagers, who do not collect forest products, also buy NTFPs especially fodder, vegetables, fruits, flowers and roots. Graph 9.1 indicates that, in Purulia and Bankura

districts some NTFPs are marketed by LAMPS and NGOs. On the other hand, in West Midnapur district as the LAMPS storage centre is quite far from the research villages, villagers do not go there to sell their collected NTFPs. There is not even an NGO-run storage or a marketing centre in Jamboni range of West Midnapur district (Appendix 3).

According to the Forest Department officers, the type and quantity of most of NTFPs are not enough to encourage organised bodies to invest in infrastructure building. During fieldwork, however, it was noticed that forest dwellers collect several types of NTFPs for domestic as well as commercial purposes throughout the year. Although the quantity of production varies from one year to another, the total amount of harvested NTFPs cannot be ignored. It is only because of the lack of a market, forest dwellers do not collect several NTFPs, which are used for multiple purposes. When mobile agents or other organisations come to purchase these products, then only villagers collect them. If at the block level storage and marketing centres are developed from where industrial units or city merchants can purchase, then the problem will be solved and the economic condition of forest dwellers may be improved. Block officers or Rangers could notify industrial units or city level wholesalers about the collection period for each NTFP, which are available in high quantities in their forest area, so that they can come at the right time and collect from villagers directly.

As stated in the WEBCON report (2007), without eliminating middlemen, in order to reduce the exploitation of informal marketing channels, three important measures can be taken. First, the actual collectors must be able to obtain up-to-date market information, particularly about those products which are available in the local forests. Second, a Gram Panchayat level or Block level storage and marketing centre for NTFPs is needed, where government officers can visit if needed. Thus, even if middlemen purchase any NTFPs from actual collectors from these markets, the price distortion will be less. Finally, the minimum support price for each NTFP should be determined and updated on a regular basis by the forest officers considering the productivity, availability and demand. To reveal the market information, information-technology can be used at each level of the marketing channels.

> “The marketing information system to be enabled by computers and internet will source market information locally as well as nationally and internationally, process and analyze it, and disseminate it widely to private parties including gatherers, growers, processors, traders and buyers and government decision-makers. It will lead to better decision-making, and help reduce the miss-match between supply and demand.” (Katiyar, 2007, p. 44)

9.5 Conclusion

The development of a knowledge base, including the documentation of NTFPs, is the biggest challenge at the moment for the enhancement of NTFPs business. Following the mapping of the availability of NTFPs, giant industrial units including pharmaceutical companies (such as Dabar and Emami) can be invited. Therefore, the quantity of available NTFPs is one of the most important factors to understand for the formulation of marketing strategies to control the black market of NTFPs. Middlemen can work in the system, but the Forest Department should be informed about their number, their working area and which products they are marketing. Without following the rules and regulation of forestry, if middlemen do the business then that may adversely affect the forest ecology and at the same time the forest-based economy will not be improved. The prospect of quick money (easy profit) motivates forest dwellers to collect forest products irrationally for middlemen. To control this unsustainable harvesting, however, government authorised bodies will have to build storage and marketing facilities. This strategy worked in Dhamtari project in Chhattisgarh (Katiyar, 2007) where the establishment of storage and marketing centres by government-authorised bodies has created an opportunity for forest dwellers to sell their collected NTFPs in an organised way with appropriate market prices. Thus, forest dwellers can earn more money collecting same amount of products. As socio-economic status increases, forest dwellers may also shift to other professions that will ultimately reduce their dependence on native forests, and subsequently the forest quality may improve.

Commercial exploitation whether for the formal or informal market, is normally detrimental to the forest ecosystem. Commercial cultivation should be undertaken on private or government fallow land, not within the forest. A huge amount of uncultivated barren land (owned by the government) is available in the districts of Purulia, Bankura and West Midnapur. To control the commercial harvesting of NTFPs in forest area, the state forest policy must allow forest dwellers to collect NTFPs only for their domestic needs with a limited amount of NTFPs being permitted to be sold. This collection strategy and restrictions, however, are not followed when money becomes the most important factor for actual collectors. Manufacturing of value-added products could be lucrative compared to selling raw NTFPs. For this purpose, training on value-added products to forest dwellers can improve this economic circumstances. The prices of NTFPs are normally decided considering the local market demand, rather than its use value or external demand (Malhotra, 1992). There are some NTFPs which have multiple uses or have external demand. If the prices of these products increase with the intervention of an organised marketing body, then actual collectors can earn more cash selling the same amount of product.

Cattle have an important role in the forest livelihoods of dry-deciduous forest areas and these cattle mainly feed on forest products. Collection of fodder or availability of grazing for the most marginal (often landless) socio-economic groups should be considered when decisions are taken on NTFPs harvesting, especially for economic purposes. The collection of fodder sometimes destroys commercially important NTFPs. Intensive study is needed by the Forest Department to establish how many cattle can be allowed in a particular forest area considering the carrying capacity of cattle of that particular area (Director, NAEB, Jadavpur University, Kolkata, elite interview, 19th September 2008).

With an increase in forest area and plant species, the available type and quantity of NTFPs will be boosted. Those plants from which more than one NTFP can be harvested (Appendix 3) or which are important for timber as well as NTFP have to be protected. For example, from the Mahua or Mahul (*Madhuca indica*) tree, flowers, fruit and seed are harvested for different purposes. These are collected for domestic as well as commercial needs so forest dwellers must save Mahua trees from illegal felling. This is same for the species of Sal and Piyal. Instead of timber, if forest dwellers concentrate on NTFPs collection for commercial purpose, then illegal timber felling will be reduced and the forest will survive for the future. Forest dependent people can earn a comparatively better price from NTFPs business than firewood selling. For example, normally forest villagers get Rs 1/- for a kilo of firewood. Therefore, in a day a forest villager can earn a maximum of Rs 100/- selling 100 kilos of firewood, which is not at all an easy task. On the other, if they sell medicinal plants or NTFPs, which are used as industrial raw materials, to a genuine purchaser then can be paid more money from the same quantity of product. However, it is also true that the availability of NTFPs vary from one year to another and from place to place (Ranger, Arsha range, Purulia district, semi-structured interview, 24th September 2008).

The level of knowledge about the relationships between ecosystem – ecology and the proper harvesting of NTFPs has yet to be developed at the grassroots level. This is true in the case of forest villagers as well as Forest Department staff. Both marketing channels of NTFPs are important and, in both cases, forest dwellers are involved in the harvesting of NTFPs. Therefore, it is necessary to create awareness among them about the sustainability of their actions. To solve this problem, academic and non-academic research is needed which will improve the knowledge base and expose the indigenous knowledge. Precise government policies regarding NTFPs harvesting and forest livelihoods improvement should be disseminated to grassroots level forest officers as well as forest villagers.

Chapter 10

NTFPs and the government policies in West Bengal

10.1 Introduction

Considering the commercial and livelihood-related value of NTFPs, there is a strong case for a dedicated policy to promote the sustainable harvesting of NTFPs in many countries (Schreckenberg *et al.*, 2006). From discussions in the previous chapters, it is clear that for West Bengal, a precise policy on documentation, collection, storage and marketing of NTFPs would be extremely helpful in promoting the sustainable management of forest ecosystems and supporting the livelihoods of forest communities. Such a policy, however, would need to maintain a high degree of flexibility as dependence on NTFPs varies from one community to another in the same state (Fernandes, 1986).

The Central Government forest policy of 1952 was modified in 1988 in recognition of the failure of existing forest policy to prevent forest degradation and improve the livelihoods of forest dwellers. Another important impetus was a growing realisation that local people needed to be more involved with forest management: a view supported by the success of participatory forest management in Arabari forest range area of West Bengal's West Midnapur district.

> "In 1988, new forest policy was declared replacing older one of 1952 giving stress on conservation and meeting the requirements of rural and tribal population. In West Bengal, being encouraged by the 'Arabari experience' of forest management with people's participation and performance of the informal forest protection committees working in south West Bengal, the state came out with the historical resolution number 4461 – FR. D/IS – 16 / 88 dated 27.07.1990 for formation of forest protection committees with the people living in the vicinity of the forests and allowing them some usufructuary benefits including 25% share of the final harvest." (Government of West Bengal, 1997, p. 54).

India's recent NTFP harvesting strategy has placed special emphasis on forest dwellers' household needs and their socio-economic condition as forest fringe dwellers are often towards the bottom of the socio-economic hierarchy. Forests represent an important source of natural capital for their sustainable livelihoods as well as being strongly linked to villagers' socio-cultural life. In 1976, the National Commission on Agriculture (NCA) recommended that

for subsistence purposes, forest dwellers can have food, fodder, fuel and timber from the local 'Social Forests' (Jewitt, 2002). According to Jewitt (2002, p. 72):

> "At the root of the NCA's argument for social forestry was the feeling that 'rural people have not contributed much towards the maintenance or regeneration of forests. Having over-exploited the resource, they cannot in all fairness expect that someone will take the trouble of providing them with forest produce free of charge' (Government of India, 1976, p. 25). This lack of consideration for forest dwellers' interests marked a low point in the history of Indian forest policy that echoes Elwin's comment that the 'rights and privileges' granted to local people by the colonial Forest Department had been downgraded to 'rights and concessions' in 1952 and 'concessions' thereafter (Elwin, 1964)."

Social forestry in India started working from the early 1980s in planted forests rather than open forests, where the forest dependent population is higher. In the JFM system, FPC members are paid for plantation work as well as for scheduled fellings. From the net profit of timber selling, FPC members get 25 per cent for the protection of forest cover in West Bengal. However, plantation or felling operations do not happen every year. Therefore, to maintain forest dwellers' interest in forest protection, India's Forest Department try to emphasise the harvesting and value-addition of NTFPs (Kumar and Corbridge, 2002; Corbridge and Jewitt, 1997). Market centres for NTFPs and value-added products have developed in several states including Jharkhand in the city of Jamshedpur. To control firewood collection by forest dwellers for sale at the local market, NTFP-based industries received special attention by the Forest Department in the 1990s. Thus, the NTFPs industry has become closely centred to the JFM system (Kumar and Rangan, 1996).

With increases in the commercial collection of NTFPs, however, there is a danger that forest cover is being disturbed due to the destructive harvesting of forest products. As a result, the Ministry of Environment and Forests, Government of India modified its JFM policy of 1989 in the early 2000s to take account of the importance of NTFPs in forest livelihoods. The Department of Forest, Government of West Bengal has further extended the usufructuary benefits for forest dwellers through the Forest Resolution (No. 2340-For Dated 14.07.2004) of 2004[15].

[15] Usufructuary Benefits (Forest Resolution No. 2340-For Dated 14.07.2004) –

1. The members will have to protect the forest/plantation/wildlife for at least 5 years to be elegible for sharing of usufructs under this programme.
2. The members shall be entitled to collect following items free of royalty without causing any damage to forest/plantations.

According to Sarker and Das (2009, p. 2):

> "The crucial importance of sustainable forest management was emphasized by the adhoc intergovernmental Panel on Forest at the fourth session of the Eleventh World Forestry Congress held in October 13-22, 1997 (Chandrasekharan, 1998; Mallik, 2000). Such observation does contribute to an emerging consensus on the feasibility of increasing NTFP yields that need to be sustained effectively through participatory forest management. In keeping with these objectives, the Joint Forest Management circular in India, issued in 1990, in pursuance of the National Forest Policy, was to set a new policy on 'involvement of village communities and village assemblies in the regeneration of degraded forest land' (Upadhyay, 2003:939). It recognized the need to fulfil the requirements of food, fodder, fuel wood, minor forest produce and small timber of rural and tribal people, and emphasized the need to create massive people's movement for protection and development of forest."

However, India has little in the way of a specific NTFP policy at present, although NTFPs have received special attention in the JFM resolution as a result of their importance to forest communities. According to the Government of India (1990):

> "The National Forest Policy, 1988 envisages people's involvement in the development and protection of forests. The requirements of fuel-wood, fodder and small timber such as house building material, of the tribals and other villager living in and near the forests, are to be treated as first charge on forest produce. The policy document

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a. Fallen twigs, grass, fruits (excluding cashew), flowers, mushroom, seeds, leaves and intercrops raised by FPCs subject to any restriction imposed from time to time provided, however such collection will be not allowed in National Park, core are of Tiger Reserve and ... Sanctuary.
b. Medicinal plants in Nadia, Murshidabad district will be permitted to be collected by the FPC members free strictly on the basis of approved micro-plans, except in National Park....
c. Members of the FPC will receive 25% of net sale proceeds of firewood and poles, which are harvested during thinning and cultural operations. The poles for the purpose of this order will be under 90 cm, bgh. for all species except Teak. For Teak upper limited of bgh is 60 cm.
d. Timber would not be subject to revenue sharing. However, lops and tops derived out of clear felling as per approved working pan, which comes under tha category of firewood, would be shared on 25% net sale proceeds basis.

3. Entire Sal seeds as collected shall have to be deposited with the West Bengal Tribal Development Cooperative Corporation Ltd., through the local LAMPS (where LAMPS are functioning)and LAMPS will pay the members, in approved tariff, against their individual collection.
4. The concerned forest official will distribute to the eligible members their proportionate share of the usufructs from the harvesting after satisfactory performanceof functions...
5. The usufruct sharing will be subject to restrictions imposed from time to time on account of Silvicultural and Management requirements and from preservation of wildlife point of view.

> envisages it as one of the essentials of forest management that the forest communities should be motivated to identify themselves with the development and protection of forests from which they derive benefits." (The Circular Concerning Joint Forest Management No. 6-21/89-P.P, Dated: 1st June 1990; cited from: http://www.rupfor.org/downloadq/CircularOnJFM1990.pdf)

By the end of 2000, about twenty-two state governments of India had adopted this resolution to preserve their state forests and to improve the forest livelihoods. To strengthen JFM, the resolution of 1989 was modified based on feedback received from the state governments in 2002 (No.22-8/2000-JFM, Dated: 24th December 2002). Presently, some other Indian states such as Andhra Pradesh, Karnataka and Orissa have their own NTFP policy. However, the West Bengal State Government follows the Central Government instruction regarding NTFP harvesting in terms of what is included on NTFPs in the JFM resolution.

The ADFO of Purulia Division (semi-structured interview, 30th September 2008) takes the view that the State Government's NTFP policy focuses primarily on scientific harvesting to protect the forest resource base, but the potential for NTFPs to minimise illegal timber felling by helping to improve of the socio-economic status of actual collectors is also recognised. Thus, the State Forest Department focuses on three priorities – a) scientific harvesting, b) sustainable use of resources and, c) the benefit for the forest people.

The ADFO of Bankura South Forest Division (semi-structured interview, 7th November 2008) mentioned that the West Bengal State Government's NTFP policy only covers the harvesting of Kendu leaves and Sal seeds. Forest dwellers are allowed to collect other NTFPs free of charge for their domestic needs and a certain amount of these products can be collected to sell at the local market. Unsurprisingly, forest dwellers do not follow these restrictions. In response to demand from middlemen and industrial units, they harvest as much as they can in order to earn some extra money. The Conservator of Forest, Working Plan & GIS, Department of Forest, Government of West Bengal remarked (semi-structured interview, 22nd October 2008), "…to control the unscientific and ruthless harvesting of NTFPs there is a thinking to include a different comprehensive section on NTFPs in the National Working Plan Code. …in 2004 National Working Plan Code there is a distinct section on NTFPs. This may create awareness among forest dwellers about the importance of NTFPs".

10.2 The importance of NTFP policy in West Bengal

Panigrahi (2007) argues that, NTFPs have enormous potential to diminish the poverty of forest fringe people. In India, forest dwellers depend on the native forest for a significant proportion of their food, fodder and medicinal requirements. However, only a few Indian states like Orissa, Karnataka and Andhra Pradesh have already developed their own NTFP policy for systematic and scientific harvesting. Yet despite the fact that West Bengal was key in getting JFM off the ground with the Arabari experiment, there is no distinct State policy for the proper management of NTFPs.

> "NTFPs help in sustaining the rural lives for half the long drawn year. Inspite of this, policies and programmes relating to governance of NTFPs ignored the potentiality of NTFPs in poverty alleviation. Orissa, one of the poorest states located on the eastern side of the Indian sub-continent provides important lessons in this regard." (Panigrahi, 2007, http://www.recoftc.org/site/index.php?id=530)

In West Bengal, hundreds of NTFPs are available in the north, south and south-western forest areas. The type, quality and quantity of NTFPs vary significantly with the environmental variations of the State. In the north and south of the State, reserved forests and sanctuaries tend to be found where entry into forest areas and the collection of forest products is somewhat restricted. In contrast, the more densely populated forest areas in the south-western part of the State contain mainly protected forest from which forest fringe dwellers collect NTFPs for their domestic needs as well as for sale at market without paying any royalty to the Forest Department. The number of tribal-dominated forest communities is also higher in this region and a considerable number of these forest communities depend on forest product harvesting for their livelihoods. Therefore, an explicit NTFPs policy for the State is urgently needed because in the last few years the commercial collection of NTFPs has increased noticeably from this region. A detailed guideline on NTFPs harvesting can also be included in the JFM resolution.

In the dry-deciduous forest areas of the south-western part of West Bengal, middlemen or mobile agents dominate NTFP marketing channels, overpowering the relatively weaker government authorised formal marketing channels. The preservation of forest ecology is not given adequate priority in the informal marketing channels. In many cases, only a small proportion of NTFP income reaches the actual collectors as intermediaries ensure that they make their own profit. Therefore, the implementation of a State policy on NTFP might help to maintain forest quality to some extent, by controlling the destruction of forest areas whilst simultaneously promoting the economic enhancement of forest fringe marginal communities.

This has certainly occurred elsewhere and Shreckenberg (2006) describes how the CEPFOR[16] project worked in Mexico and Bolivia:

> "The CEPFOR project highlights the fact that NTFP commercialization activities can, in some circumstances, contribute to rural poverty reduction. Without the proper regulation and support, however, they can also lead to overexploitation of the natural resource. There is justification, therefore, for well-targeted interventions to optimize the benefits of NTFP commercialization and reduce the risks of any negative impacts". (Schreckenberg *et al.*, 2006, p. 123)

There could be a number of advantages associated with the development of an NTFP policy in West Bengal in terms of improving understandings of the role of NTFPs in forest socio-cultural life and their present commercial significance in forest livelihoods. The sustainable collection and processing of NTFPs can enhance employment and rural development opportunities. An NTFPs policy may also help to safeguard wild animals through the promotion of responsible and sustainable management and harvesting strategies.

> "In the present context of JFM, study and development of NTFP is very important. It has been realised that if NTFP development is organised scientifically it can help in providing more employment and income augmenting opportunities to the FPC people which in turn may help in sustenance of JFM and improvement of forests." (West Midnapur Forest Division Office, 1995, p. 1)

However, there is an uncertainty that how much NTFP policy would be efficient to protect the open dry-deciduous forests of West Bengal reducing timber felling and, at the same time, improving the socio-economic status of the poorest forest dwellers. According to a staff member from the Forest Training Centre (FTC) of Jhargram in West Midnapur district (semi-structured interview, 15th December 2008), a precise NTFP policy provided by State Government may create pressure on Forest Department officials as well as forest dwellers to give greater priority to NTFPs. If the Forest Department staff were given precise instructions about NTFP harvesting, they could discuss this with actual collectors as well as local merchants, who may not fully appreciate the impacts of certain NTFP harvesting practices on forest regeneration.

Having an explicit NTFP policy might be helpful in reducing illegal timber felling, as has already happened in Orissa (Panigrahi, 2007) where a large number of forest communities

[16] Project title: Commercialization of non-timber forest products (NTFPs) in Mexico and Bolivia: factors influencing success.

are involved in Kendu leaf collection and a well-organised marketing system has already been developed for this product. As forest dwellers can earn a good amount of money from Kendu leaf harvesting, they need not depend on firewood selling. Thus, timber felling has reduced dramatically in Orissa's forests. If forest people get more permanent marketing centres for NTFPs and better remuneration for their work, then they may be in a better position to undertake more sustainable systems of NTFP harvesting. If it becomes clear to them that through the sustainable harvesting of NTFPs, the plant species will survive for the future and the supply of forest products will be remain intact for their household needs as well as to sell a limited amount at the local market, then they might get interest to protect the native forest. However, presently, the system is working like a vicious circle. If forest fringe villagers do not get any wage labouring job or NTFPs to sell, then they collect firewood (sometimes even green trees) to earn some money. Firewood always has a ready market in all three research districts and the increasing collection of firewood is affecting the forest cover.

The Forest Department staff of Arsha range, Purulia district appreciate (group discussion, 24th September 2008) that there is a vicious circle in the forest-based economy of Purulia district, where the demand for firewood is very high. The scenario is similar in Bankura and West Midnapur districts as well. Even green trees are collected for this purpose. Therefore, if villagers were willing to adopt more efficient (but locally appropriate) stoves or to use alternative fuels (such as coal and LPG) for domestic fuel purposes, instead of or in addition to firewood, then that might help to preserve the open dry-deciduous forests and at the same time to raise the type and quantity of NTFPs. However, to use coal and LPG, the socio-economic development of forest fringe dwellers is needed and that can be done through the promotion of NTFPs-based cottage industries and the organised marketing system of value-added products (Saxena, 2003).

10.3 NTFP policy and the promotion of sustainable forest livelihoods

The development of an NTFP policy in West Bengal might help to preserve the forest ecosystem by encouraging the development of a more organised system of NTFPs harvesting, which could in turn help to improve the livelihoods of forest villagers in general. In Orissa and Andhra Pradesh, for example, the promotion of the State's own NTFP policy has recovered sustainable forest livelihoods through the development of organised NTFP marketing channels (Sarker and Das, 2009; Panigrahi, 2007). With the formalisation of NTFP marketing, actual collectors can be paid a reasonable price for their collected products and subsequently the overexploitation of forest products may decline. For the enhancement of formal marketing systems, however, a precise NTFP policy might be useful. Orissa's

decision to adopt a precise NTFP policy, for example, has had positive implications in promoting the sustainable forest livelihoods (Sarker and Das, 2009).

In JFM systems in West Bengal, forest protection committee members are paid for plantation and felling work. However, planting and felling does not happen on a regular basis in a particular forest area. In contrast, NTFPs are normally produced every year and different NTFPs are gathered in different seasons of the year. Thus, the economic value of NTFPs can be greater than that associated with villagers' share of the marketed timber (Mukherjee, 2002; Sarker and Das, 2004; Correa, 1999; Naik, 1997).

> "There are evidences that the only share of timber product (usually one-fourth of the total) to poor forest-dependent communities after every five year period threatened the existence of forest resources. Forest-dependent communities require continuous and annual flow of forest products for their survival. The rich experience of JFM in various states of our country suggests that not only the share of timber products to poor forest communities but also the benefit of non-timber forest products (NTFPs) to them *[is]* required for the success of this programme." (Sarker and Das, 2009, p. 2)

Presently, the Forest Department asks FPC members to harvest those NTFPs which have a readymade market so that forest villagers can sell their products soon after collection. To work as a bridge between actual collectors and big merchants, the Forest Department has already permitted some organisations (such as Ramakrishna Mission, NAEB and IBRAD) to become involved in the systematic harvesting of NTFPs. However, without an explicit policy on NTFPs harvesting, these organisations also face difficulties in terms of guiding forest dwellers. In the NTFP policies developed by Orissa and Andhra Pradesh, it has been clearly written how much of each product can be collected from a particular forest area and where it should be sold.

In order to promote more sustainable forest livelihoods, the Ministry of Environment and Forest (MoEF) of the Government of India has already implemented some strategies regarding NTFP harvesting. Following the modified resolution of 'West Bengal Protected Forest Rules 1956', No. 4461 – For D/1S-16/88 dated the 12th July 1989, forest dwellers are allowed to collect some NTFPs free of charge for their household needs. They can also collect a limited amount of products to sell at the local market. With the collection of leaves, flowers, fruits, seeds and brushwood, each family can also collect one pole per annum for making a plough and three poles for house construction after every five years. However, to get these advantages, forest dwellers have to prove that they have been living in the forest area for at least 75 years or so (Forest Survey of India, Eastern Zone, 1985, p. 20). Following

Central Government's instructions, the West Bengal State Government has modified its 1956 Forest Protection Rules.

> "According to the modified resolution of 'West Bengal Protected Forest Rules 1956', No. 4461 – For D/1S-16/88 dated the 12th July 1989, the [FPC] members shall be entitled to collect following items free of royalty without causing any damage to forest plantation:
>
> a) Fallen twigs, grass, fruits, flowers, seeds (excluding cashew) and leaves.
> b) One fourth of the produce obtained as intermediate yield from RDF coppicing, multiple shoot cutting, thinning etc and also 25% of the net sell proceeds of cashew, where available, to be shared proportionately.
>
> This will not in any manner extinguish the rights and privileges already granted to the members of the Scheduled Tribes by the [West Bengal] State Government in their order No 2001- For dated 20.04.1981 and/or may be granted in future." (Government of West Bengal – Directorate of Forests, 1997, p. 189)

To activate these policies at the ground level, Forest Department staff and villagers have to have a clear idea about the importance of the forest environment in the society. The Deputy Director in Charge of the Regional Office of the Forest Survey of India, Eastern Region thinks (elite interview, 21st October 2008), that educational institutions and local primary schools can play a vital role in terms of policy activation. There are primary schools located in almost every village and NGOs, government and semi-government bodies can use these schools to organise awareness generation programmes. At the grassroots level, NTFP policy can be supported through the development of community-based enterprises as well. In community-based enterprise systems, forest community members could work in groups; each of which has responsibility for different tasks (such as – collection, storage, processing, marketing etc).

It is, however, not always beneficial to use the Central Government policy in a modified form. Like Orissa, Andhra Pradesh and some other states of India, West Bengal needs its own NTFP policy that can consider the specific socio-economic characteristics of local forest communities (Roy, 1991). An imported NTFP policy may not work as well for the development of forest and forest fringe dwellers of West Bengal (Conservator of Forest, Research and Development, semi-structured interview, 12th November 2008).

Within Indian forestry, the Forest Department considers JFM as an effective tool for the development of deprived forest dwellers. JFM focuses on empowering FPC members

through adequate training and guidance for the preservation and management of all forest resources including timber and NTFPs. State Forest Departments often follow the main theme of the JFM resolution during the implementation of NTFP policy. The Bawa Committee's report (1973) considered NTFPs as an important source of income for forest fringe dwellers. However, there are a number of problems that actual collectors face during the harvesting of NTFPs. A lack of knowledge about systematic harvesting, storage, processing including grading, value-addition and marketing prevent them getting an appropriate price for their collected products. Cooperatives in these communities might be helpful in solving these problems. The committee also thinks that forest dwellers should be more aware about NTFP collection and marketing policies to help avoid unsustainable harvesting practices (Backward Classes Welfare Department, Government of West Bengal, 2008, available at: http://anagrasarkalyan.gov.in/htm/lamps.html, cited on 10th October, 2009).

Policy intervention could help to check exploitative practices and make it easier to regularize the NTFP marketing system. Evidence from Andhra Pradesh and Orissa indicates that the poverty of forest fringe dwellers can be significantly reduced if NTFP policy is sensitive to the role of forests in the culture and livelihoods of forest dwellers and can provide additional economic benefits in the form of microfinance for village level NTFP value addition and marketing (Saxena, 2003). For NTFP policy to be successful in West Bengal, policy makers must keep in mind the interdependence of forests, forest products and forest dwellers as, although there is evidence that forest dependence is declining in certain areas, a large proportion of forest dwellers still collect forest products on a regular basis (Roy, 1991).

10.4 NTFP policy and the conservation of forest ecology

As has been happen in Orissa, Andhra Pradesh and Tamil Nadu, an effective NTFP policy can play an important role in protecting forest ecosystems. This is because more systematic NTFP harvesting methods can reduce the exploitation of vulnerable species, while enabling collectors to earn more money for their NTFPs. Dutta and Adhikari's (1998) work has shown that a policy emphasis on adding value to NTFPs through simple processing methods can also be lucrative for forest dwellers. According to the ADFO (semi-structured interview, 27th November 2008) of Jhargram in West Midnapur district, more selective harvesting can promote the protection of local microclimates as well as the wider ecosystem. Soil erosion is also a major problem in these three districts and the protection of woodlands may solve this problem to some extent.

> "With the degradation of forest areas the soil erosion is increasing in the dry-deciduous forest areas of West Bengal. Therefore, if forest people are motivated in NTFPs collection then it will stop the boundless collection of firewood and timber products which will promote to increase such type of open forest areas." (Founder Chairman of IBRAD, elite interview, 18th September 2008)

The Conservator of Forest, Research and Development Wing, Government of West Bengal remarked (semi-structured interview, 12th November 2008) that the State Forest Department is planning to encourage FPC members to undertake intercropping activities by planting crops between two rows of newly planted trees. These crops are usually bushes, shrubs or vegetables, which can be used as fodder, medicinal herbs or food. Such strategies help to address the 'delayed gratification' problem associated with most JFM projects by giving FPC members a quick and useful return from the scheme. This type of inter-cropping system provides NTFPs on a regular basis without affecting the timber species. According to Jamdaha forest villagers in Ranibandh range of Bankura district (group discussion, 4th November 2008), this inter-cropping will also be useful to supply fodder for their domestic animals. However, only once this system is converted into policy and starts working in combination with JFM policy will the benefit come out.

The idea, however, that NTFPs can play an important role in forest management is not clear to a large number of Forest Department staff and forest dwellers. Due to variations in production and the lack of storage and marketing centres, the Forest Department high-ranking officers are not interested in generating a precise policy for every NTFP. Middlemen and local merchants take advantage of the lack of infrastructure for organised harvesting and marketing of NTFPs. Simultaneously, informal marketing channels tend ultimately to adversely affect the forest cover.

> "There may be hundreds of such products (NTFPs) but the Forest Department cannot have marketing policy for all these things. So basically the Forest Department cannot interfere in every NTFP related activity because that will not be cost effective." (PCCF, Government of West Bengal, elite interview, 20th October 2008)

Most NTFP-producing shrubs and herbs, including medicinal plants, which are normally found on the forest surface, are often considered to be weeds. The Forest Department allows forest fringe people to collect these shrubs and bushes on the basis that if these shrubs are cleared on a regular basis then the growth of timber species will be faster and more healthy. In some cases, however, this practice can be very damaging (Roy *et al.*, 1993). For example, because of the clearance of ground shrubs, Kalmegh production in the Ajodhya hill forests

has declined dramatically. The clearance of shrubs can affect the forest ecosystem. Occasionally, the Forest Department pays FPC members to clear surface flora, including different types of valuable medicinal plants, to promote the growth of timber species (NAEB staff, Jadavpur University, Kolkata, group discussion, 17th September 2008). When FPC members collect this ground flora as fodder or for any other purpose, they usually treat these species as insignificant, but during clearing operations the main timber species are often disturbed and damaged. A clearer policy on NTFPs would help to clarify the importance of these surface species to forest dwellers as well as Forest Department staff.

Another reason for the development of NTFP policy is the recent increase in NTFPs collection and sale. If there is a straightforward policy for every NTFP, then those villagers, who collect NTFPs on a regular basis, may protest against those who are involved with illegal timber felling (Ranger, Arsha range, Purulia district, semi-structured interview, 24th September 2008). When FPC members go to the forest to collect NTFPs, they can monitor that no illegal felling or destructive collection of NTFPs takes place, damaging the resource base. This could be another reason to link NTFPs management policy with JFM policy. A more organised NTFP policy can raise the availability and quantity of different types of NTFPs as well as promoting the successful management and maintenance of the concerned forest area (Roy, 1991).

In Purulia, Bankura and West Midnapur districts, Sal forests are dominant and Sal leaf collection for plate making is an important source of income for tribal forest villagers. Like Kendu leaves and Sal seeds, Sal leaves are not collected by LAMPS or any other government authorised organisation. The market for Sal plates is largely controlled by mobile agents and middlemen. Mobile agents visit the interior forest villages more than once a week to collect Sal plates as these plates are in high demand all over the State and are even exported to other states. However, because of a lack of rules and regulations regarding the Sal plate business, there is a danger of Sal leaves being over-exploited. The hand-stitched Sal plates (*Siapata*) are sold at a very low price compared to machine pressed plates, which use more resources but fetch a better price.

Since there is a demand for Sal plates throughout the year and forest dwellers know that they can sell Sal plates even from their homes, they try to collect as many Sal leaves as possible every day. This creates pressure on Sal trees. Sal trees are not only important for leaves but their seeds, gum and flowers are also used for several purposes. The timber value of Sal is also high. The continuous collection of Sal leaves not only affects the Sal species, but at the same time associated species as well. A specific policy on Sal plates

could reduce the exploitation of actual producers by middlemen, providing them the proper market value.

> "...the sustainability of JFM depends on the regular survival needs of poor forest communities from the collection, consumption and sale of NTFPs. Lower profit margin or unfair price for collectors' might lead to large illicit felling of timber product by the poor forest communities ... To this end, competitive price structure of the NTFPs is the urgent need for the benefit of poor forest communities as well as for final consumers of these products. Creating an open and efficient market for communities would generate higher revenues and offer a strong incentive for communities to take on increasing responsibility for forest management and promote more efficient forest utilization." (World Bank, 2006: 42, from Sarker and Das, 2009)

The Deputy Director in Charge of the Regional Office of Forest Survey of India, Eastern Region mentioned (elite interview, 21st October 2008) that any NTFP policy seeking to promote better forest ecosystem management must also take on board the need to combine indigenous and modern scientific knowledge (Jewitt, 2002). This is because if NTFP policy is shaped without giving priority of forest dwellers' lifelong experiences, it might overlook the use value of NTFPs in forest livelihoods and eventually fail to defend the forest ecosystem.

Professor Ray, the Founder Chairman of IBRAD and a well-known forest researcher of the State (elite interview, 18th September 2008) believes that there is no need to make forest dwellers aware about the Forest Department's NTFP policy. Showing a high degree of sensitivity to 'tacit' environmental knowledge and local forest cultures, he argued that forest dwellers are born and brought up in the forest so they have their own indigenous knowledge to protect forests and forest products and that this will work much better than the implementation of a generic policy.

10.5 Forest peoples' recommendations for the enhancement of NTFP policy

During the fieldwork for this research, many forest dwellers appeared irritated by discussions about NTFP harvesting policy and associated rules and regulations. This is because they consider the forest as their own property and feel they can and should be able to collect products whenever they want, without restriction. None of the forest villagers that the researcher had discussions with was aware of any NTFP policy; not even the relatively longstanding State policy on Kendu leaves or Sal seeds. They are aware that LAMPS storage and marketing centres are there to purchase Sal seeds and Kendu leaves, but few use these centres as it is difficult for them to transport their NTFPs there. LAMPS are also

known for some of their development schemes which are targeted at the improvement of forest livelihoods.

With the increase of forest populations, the demand for cultivated land is increasing in forest fringe areas. Domestic demand for firewood and other forest products has increased significantly as have local, national and international markets for these products which has put pressure on West Bengal's dry-deciduous forest. To protect the local forests, Kendua villagers in Jamboni range of West Midnapur district remarked:

> *"We have to collect only as many NTFPs as the Forest Department will permit. We should follow the Forest Department's rules. We are very poor people so if the Forest Department takes any action against us then we will suffer. We, however, have not got any instruction from forest officers so we do not know about any policy or restriction regarding NTFPs harvesting*, *but we FPC members normally do not allow anybody to collect timber. If any FPC member collects timber then that creates tension in between us. We have to protect the local forest at any cost for our own survival. Our population and demand is increasing*. *We are ready to talk with Forest Department staff and to listen their advice*." (Group discussion, 14th December 2008, medium of conversation was Bengali)

With the decrease in types and quantity of NTFPs, forest dwellers are mostly collecting NTFPs for their domestic needs. If they collect more than their requirements, they usually sell such items at the local market or via intermediaries and mobile agents. However, there are a number of locally available NTFPs, that are not collected for subsistence purposes, but are collected to meet demand from intermediaries, NGOs and agents from industrial units. Apart from Kendu leaves, Sal seeds and a few other NTFPs, most NTFPs are marketed through informal channels. The actual collectors sometimes do not even know what the NTFPs they are collecting are used for or who is the actual purchaser, although they are often aware that the items that they are collecting fetch a much better price at the city market. For this reason, they would like assistance from the Forest Department in obtaining a better price for such items. They think, "*the Forest Department can provide advice on NTFP collection, storage, gradation, value-addition and marketing* [like the JFM strategy used for timber felling]*. For this purpose, regular discussion is needed with Forest Department staff and before every seasonal collection, collectors should be informed of current market prices for different NTFPs*" (Jamdaha villagers, Ranibandh range, Bankura district, group discussion, 4th November 2008).

During the fieldwork, a number of female villagers highlighted the fact that their opinion was not considered on NTFP harvesting. Although women and children from forest communities in these three Districts go to the forest normally every day to collect firewood, fodder and other NTFPs and they have a good knowledge about the native forest, FPCs in the area are in general male dominated (Chatterjee, 1995). Men normally collect NTFPs if they are not working as agricultural labourers or if mobile agents ask them to collect certain products. Echoing the situation in many other parts of India (Sarin, 1995b; Jewitt, 2002; Locke, 1999), when meetings are arranged with Forest Department staff, it is normally male villagers who attend and if women and children do attend they do not tend to participate actively. Occasionally, social taboos also create barriers for female members to share their experiences for the conservation of local forest and forest products.

> "The Beat Officers normally meet only with the men of the [forest] villages and never consider women a functional unit of society. This effectively cuts them [women] off from the FPC programme and undermines their commitment to it. As they are never formally recognised or listened to, they are unable to have their opinions on forest management considered, thus depriving the programme of their rich experiences in the management of forests for fuel wood, fodder and NTFPs. If only to improve forest management, women should be involved in FPC meetings." (Roy, 1991, p. 8)

To develop the State's own NTFP policy, it is necessary to listen to all family members' opinions and experiences (Locke, 1999). During group discussions with forest communities, male, female as well as child members were given equal opportunity to share their views and experiences regarding collection, storage, processing and marketing of NTFPs. Several ideas and thoughts have come out from female and child members, which male members did not take into account. However, only a mass awareness among forest dwellers through education can create the opportunity for female and child members to share their ideas and thoughts about NTFPs harvesting.

10.6 NTFP policy and the outlooks of government and non-governmental bodies

For the configuration of forest policy, high-ranking Forest Department officers usually take the leading role while the views of beat or range level staffs or forest villagers tend to be rather neglected (Roy, 1991). It is only since the introduction of JFM that the views of forest villagers have been taken into consideration when attempts have been made to preserve forest resources and to complete forest related schemes. Even now, however, the main target of the Forest Department often seems to be the protection of forests and wildlife rather than the livelihoods for forest dependent villagers. In his book *Contested domains: the state,*

peasants and forests in contemporary India, Pathak (1994) has outlined the conflict over which one should get priority – forest or forest dwellers livelihoods. Therefore, success is unlikely to be achieved regarding forest policy unless forest livelihoods are given greater priority.

> "Presently JFM policy is used by every state government in India. Following the JFM resolution or policy, state governments decide the NTFPs harvesting strategy…. It was NAEB's initiative that Government of India introduced the JFM resolution in the year of 2003 and to implement it NAEB has arranged series of discussions with the *Panchayat Raj Institution* (the rural governing body), FPC members and forest officers." (Director, NAEB, Jadavpur University, Kolkata, elite interview, 19th September 2008)

In India, most of the state Forest Departments follow the JFM resolution, in a modified form, as their NTFP harvesting policy. Some states just follow the central government regulations without any modification, which occasionally has an adverse impact on forest management schemes. A few of states (such as Orissa, Andhra Pradesh, Tamil Nadu), however, have already developed their own NTFP policy according to the state's own forest features, availability of NTFPs and forest dwellers livelihoods. Panigrahi (2007), Chandrasekharan (1998) and Mallik (2000), show how Orissa and Tamil Nadu's NTFP policy have been useful in promoting the systematic harvesting of NTFPs, improving the socio-economic staus of forest fringe dwellers and reducing their exploitation by intermediaries. Dutta and Adhikari (1998) mentioned that "in the context of the creation of Forest Protection Committees in West Bengal to mobilize villagers to participate in forest regeneration, it is necessary to study the Sal leaf plate industry whose survival depends on the survival of the Sal forest" (p. 124).

The PCCF of West Bengal mentioned that only NTFPs collected from sanctuaries, wildlife parks and reserved forests are normally recorded by the Forest Department, while most collected from protected and unclassed state forests are not documented carefully. At the same time, the influence of intermediaries is higher in these two types of forest areas. Therefore, to promote the systematic harvesting of all NTFPs an extensive policy is needed for the State. The policy might be different even for the same product, collected from different types of forest areas associated with different uses (commercial or subsistence) by local populations. In some villages, potentially valuable NTFPs are not collected due to the lack of a domestic use and a commercial market for them.

> "For a few NTFPs, which are collected from sanctuaries, wildlife parks and reserved forests are recorded carefully and for these NTFPs we have very definite and specific

> policies. For example, LAMPS, the statutory body of WBTDCC can only collect Kendu leaves and Sal seeds. It is same for honey from Sunderbans Tiger Reserve and Citronella grass from North Bengal reserved forest areas. It is, however, true for most of the NTFPs, which are collected from protected or unclassed state forests, mainly dry-deciduous forest of south-western part of the State, there is no definite policy. We are thinking about it seriously, but at the same time, we have to take care of forest fringe villagers as well. They are economically at the marginal level, so if we do not take care of their livelihoods with kindness then our policy will not be successful." (PCCF, Government of West Bengal, elite interview, 20th October 2008)

According to the APCCF, Government of West Bengal (elite interview, 23rd October 2008), the only policy on NTFPs harvesting in West Bengal is the monopoly right given to the LAMPS for the collection of Kendu leaves and Sal seeds. Since, most NTFPs are collected in very small amounts for domestic uses, there is little incentive for the Forest Department to generate a policy for these products. This, however, causes a number of problems. For example, Kalmegh, Sal leaves, different types of bark, roots, modified stems, fruits, flowers and decorative items are collected every year for commercial purpose and the amount of collection is not at all negligible, but there is no policy for such products.

The Assistant Managing Director of WBTDCC remarked (semi-structured interview, 16th September 2008) that the prices of Sal seeds and Kendu leaves are decided by WBTDCC based on the quantity and the quality of collected products and what subsidy WBTDCC has been given to LAMPS in advance. During the period of auction, the WBTDCC also talks with actual collectors regarding the minimum price level. However, for other NTFPs, which are marketed by anybody, prices are mostly decided by market demand and bargaining power. Thus, the price varies frequently for these products in the informal marketing channels. Government prices are stable for at least one season. Sometimes, the price for an NTFP may be higher in the informal marketing channels compared to the government-authorised system, but this is very rare. If the Forest Department gives authorization, then the strategy followed by WBTDCC for Kendu leaves and Sal seeds marketing can be followed for other NTFPs, which have good market demand and are available in dry-deciduous forests.

> "May be Forest Department do have policy for other NTFPs as well but sorry we do not know. A project was given to the WEBCON to identify all the NTFPs produced in the State and how we can collect those products systematically. I hope that, the project has already been done…. But still now we have not got any established policy of the state Forest Department regarding other NTFPs harvesting…."(Assistant

> Managing Director, West Bengal Tribal Development Cooperative Corporation ltd (WBTDCC), Govt of West Bengal, semi-structured interview, 16th September 2008)

Many beat and range level Forest Department staff are still confused about the NTFP harvesting policy of the State. Some of them think there must be a definite policy on NTFP harvesting, but are not sure what the policy should be. Others think that there is no policy. Even the policy followed for Sal seeds or Kendu leaves is not clear to them.

> "Presently there is no precise government policy but an initiative has been taken by the Government of India. … There is no such State Government policy regarding the identification, collection, storage or marketing of NTFPs. Forest Dept is not directly involved in NTFP harvesting but they do it through some organisations, such as WBTDCC, WBFDC etc. Their involvement might create awareness regarding the scientific harvesting of NTFPs among forest dwellers and intermediaries." (Divisional Forest Officer (DFO), Purulia Division, elite interview, 29th September 2008)

Like most other Beat and Range Officers, the Ranger of Jamboni Range in Jhargram Division of West Midnapur district mentioned (semi-structured interview, 10th December 2008), "there must be some policy but it has not been distributed to the Range or Beat offices; however, there is a possibility of having State's own NTFPs policy". The lower level forest officers appreciate that because of the lack of an NTFP policy, they sometimes face problems. They cannot tell forest dwellers which products they can collect and how much they can collect in a season from a particular forest area. If NTFPs were comprehensively documented, that would facilitate the production of a State NTFP policy which will ultimately be helpful in enabling ground level forest staff members to promote the protection of the native forests.

10.7 Conclusion

In view of the present condition of forests and forest livelihoods in the fieldwork area, there is an urgent need to bring together the indigenous knowledge of forest dwellers with the scientific knowledge of ecologists, forest scientists, botanists and experts from other related areas to form an explicit policy for NTFPs. The Founder Chairman of IBRAD (elite interview, 18th September 2008) thinks, "biological and social processes should have to be understood together for the development of NTFPs policy". The biological relationships between key forest species and their associates should receive special attention while NTFP policy will be constructed.

In terms of promoting the systematic harvesting of NTFPs, the Divisional Forest Office of Bankura South Forest Division has already chalked out its own strategies. The plan is quite well-organised involving forest dwellers, Forest Department staff and experts from related areas. According to their Working Plans of 2008:

> "Harvesting and local marketing of NTFP will be done by the FPC members as per government order. NTFPs should be transported from local depot under the coverage of T.P. (Transit Pass) as per T.P. rules. Collection should be done only after seedling stages are over as per Silvicultural guideline to maintain sustainability of NTFP in south West Bengal forest also. Review should be done time to time by the concerned territorial authority on the availability of NTFP in these areas and if found that the population of particular NTFP has gone down alarmingly then the collection of that particular NTFP should be stopped immediately. Appropriate measures and suggestions of the Silviculturist are to be taken to rejuvenate the stock." (Divisional Forest Officer, Working Plans (South) Division – ll, Bankura, 2008, p. Vlll)

The APCCF, Government of West Bengal thinks (elite interview, 23rd October 2008) that if the 'general pressure' on forest resources decreases that will promote a rapid improvement in the overall forest ecosystem and thereby increase the yields of various NTFPs. However, he could not clarify the nature of this general pressure and how such pressure can be reduced. He also believes that with its existing infrastructure, the Forest Department can only develop knowledge regarding the collection, storage, processing, value-addition and marketing of NTFPs. It would be very difficult to monitor the implementation of policy at the ground level.

The deficiency of a proper policy hinders the marketing of NTFPs. The lack of a formal marketing channel mainly generates problems for small-scale producers or actual collectors, who have very limited accessibility to technical information, storing and marketing opportunities. The involvement of government authorised NGOs, industrial units and big merchants in the system can be constructive in this regard. However, NGOs and industrial units also face problems due to the absence of an explicit policy on NTFPs. Therefore, efforts are needed to achieve better coordination between the Forest Department, research organisations, NGOs and forest dwellers. Finally, following Jones *et al.*'s (2002) comments, it can be suggested, that NTFPs can contribute spectacularly to the development of a more sophisticated forest and wildlife management policy and frameworks, not only through ensuring the present supply but also protecting future forests (available at: http://www.kansaspress.ku.edu/jonnon.html, cited on 16th January 2009).

More scientific and systematic research on the role of NTFPs in forest communities' livelihoods could help the State Government and non-governmental policy makers to make policies for the socio-economic advancement of forest people of West Bengal, thereby helping to control forest degradation in this region. Greater involvement of researchers from different fields could enrich knowledge on forest livelihoods associated with the open dry-deciduous forests of West Bengal.

Chapter 11

Conclusions and further studies

11.1 Summary of the research findings

From the data analysis and discussions, it is found that there are some initiatives that have already been taken by the West Bengal State Government and NGOs to support research on the economic importance and the systematic and sustainable management of NTFPs (Sarker and Das, 2009 & 2004; Mukherjee, 2002; Mahapatra and Dey, 2001; Pandey and Gangluy, 2001; Malhotra *et al.* 1992; Ramakrishna Mission Lokasiksha Parisad, 1996). However, there is a lack of knowledge on how NTFPs can save forest cover in the long run through the socio-economic enhancement of forest dwellers. This thesis presents an overall idea of dry-deciduous forest cover in the State, the NTFPs collected from this forest area and the importance of NTFPs in forest livelihoods. The aim of the research is to create awareness among forest dwellers, Forest Department staff and related people regarding the importance of NTFPs in forest livelihoods. At the same time, the research examines how NTFPs could take a constructive role in the preservation of dry–deciduous forest area of West Bengal.

The findings of the research are diverse. First of all, although a number of studies have already documented the NTFPs (Ramakrishna Mission Lokasiksha Parisad, 1996; Roy, 2003; WEBCON, 2007; Bhattacharjee, 1997; Pal and Das 2002), available in the State including the dry-deciduous forest area, the type, quantity and quality of NTFPs varies from one document to another considerably. This is also true at the micro level. For example, according to the Second Working Plans of Purulia Forest Division 1997-98 to 2016-17 (Vol. I, p. 33-35), the types of NTFP species available in Purulia district are 69; whereas, the WEBCON (2007) reports the number to be 33. This is same for West Midnapur and Bankura districts. Several other NGOs, such as IBRAD (1991 & 92), NAEB (2008), Ramakrishna Mission (1996) have also completed projects for the systematic documentation of NTFPs. However, these reports are dissimilar to each other. There is still a lack of a well-accepted model report on NTFPs for the State. Contradictory reports on forest products create difficulties when policies are formulated for the systematic management of forest and forest products coupled with the socio-economic development of forest dwellers.

This lack of consistency with the documentation of NTFPs is also present in the case of information on the number and amount of products collected by forest dwellers, processing and uses of the products and marketing. Therefore, to produce better documentation of

NTFPs, available in the dry-deciduous forest area of the State, more rigorous scientific research is needed at the ground level. For the wildlife sanctuaries, national parks and reserved forest areas of the State, where the entry of forest fringe people is comparatively restricted, the numbers of project reports are less and the main source of information is government reports (Department of Forest, Government of West Bengal, 2005; Forest Survey of India Eastern Zone, 1985). In contrast, in protected or unclassed forests including the dry-deciduous forest, from where forest fringe people can collect NTFPs for domestic as well as commercial purposes, a number of studies have been undertaken by government in addition to private bodies. As different reports show dissimilar features, this might create confusion for Forest Department staff and policy makers and ultimately affect the forest management strategy. Therefore, a more comprehensive system of documentation of NTFPs is urgently needed by the State.

Second, the socio-cultural importance of NTFPs in forest communities to date has received insufficient attention. Tribal communities have been living for a considerable time in the dry-deciduous forest area of West Bengal. Their socio-cultural life is structured by the surrounding forest environment. Although, the dependence on forest products for socio-cultural festivals is decreasing, the importance of NTFPs should not be understated. Forest fringe dwellers hold their native forests in great affection. After the introduction of participatory forest management systems, the importance of forest dwellers' participation regarding forest conservation became clear to the Forest Department. At the same time, it has also become apparent that tribal communities are dependent on forest products for their daily household needs. Therefore, an emotional attachment exists between the forest and forest dwellers. Prospective forest policy cannot overlook this emotional attachment.

From the interviews and discussions with Forest Department staff and villagers during the fieldwork, it has become clear that forest dwellers know more about the presence of plant species in the native forest than the Forest Department staff. The Forest Department has nationalised Kendu leaves and Sal seeds because of their production quantity and market value. A few other NTFPs (such as honey, citronella and cashew nut) are also marketed by WBFDC, as there are ready markets for these NTFPs. However, there are so many other NTFPs, which are collected in abundance from the dry-deciduous forest area every year, but there is no formal marketing channel for these products. Therefore, forest dwellers are compelled to sell these products to middlemen or mobile agents, sometimes even at a minimal price. When Forest Department higher-ranking officers were asked about these NTFPs, they raised the issue of the quantity of product in a season, although, in reality the quantity of product is not at all negligible. Thus, there is a gap of knowledge between Forest

Department staff and forest dwellers regarding the availability of NTFPs in the dry-deciduous forest of West Bengal. It is necessary to sit Forest Department staff and forest community members together therefore with open minds, so that the knowledge regarding the available resources of the native forest is explored and the sustainable use of forest products is confirmed.

With the comprehensive research of forest socio-cultural life and the influence of the forest, it might be useful to discover all the available important forest products of dry-deciduous forest of West Bengal. Occasionally, middlemen or industrial agents ask forest dwellers to collect some NTFPs, but forest dwellers do not know the uses of these products and they are paid a very low price. However, these products are sold at a very high price in the city market or when used as industrial raw material. The market prices for the secondary products are always higher than primary products and forest dwellers are normally exploited in these cases.

The Forest Department could discuss with forest communities before nationalising NTFPs and could expand the marketing opportunities for these 'so called' unidentified NTFPs. The Harinaganj villagers of Jamboni range in West Midnapur district were disappointed by the price of Eucalyptus seeds which they received from middlemen. There are abundant Eucalyptus trees in the local forests of West Midnapur district and the seeds are very useful as industrial raw material. However, there is no formal market and the product is not given any importance by the Forest Department. Therefore, intermediaries seize on this opportunity. The situation is the same for Sal plates, which are a major source of income for forest fringe dwellers of all these three districts, particularly in Bankura and West Midnapur. Nationalisation of NTFPs or formal marketing system may change the economic status of forest fringe people distinctly. There are a number of roots, bark, flowers and fruits, where the quantities of production are substantial, but unfortunately, they do not receive enough attention from the Forest Department.

The lack of commercialisation of NTFPs is the fourth important finding of the research. Although, the total marketing value of NTFPs collected in dry-deciduous forests is very high at the ultimate stage of the marketing system (including formal and informal), the profit does not always reach the ground level. There is a lack of expectation from Forest Department staff as well as forest dwellers that proper NTFPs marketing can make an important contribution to the economic enhancement of marginal forest people and can improve the forest environment. In the national and international markets, the demand and price for NTFPs has been increasing every year, especially for the last two decades. However, the effects of this increasing demand very rarely influence the grassroots level commercial

activities. Thus, it is necessary to create awareness among Forest Department staff and actual collectors about the real commercial value of the collected NTFPs at the genuine market.

There are some NGOs such as NAEB, Ramakrishna Mission and IBRAD which are trying to enhance the formal marketing channels, but the initiative is not enough to have the required revolutionary change for the future. From the group discussions with these two organisations, it was apparent that their efforts are insignificant compared to the influence of the informal marketing channels already existing in the State. It is necessary to involve similar organisations for this purpose so that actual collectors can feel confident at any stage for the marketing of their collected NTFPs. Normally, NTFP collectors are not literate and they cannot presume the commercial or industrial importance of their collected products. Sometimes, forest dwellers use some products very casually for their domestic needs and they consider these products as irrelevant, but very often these products are used as an important raw material by industrial units. Therefore, literacy can take an important role in informing the commercial importance of NTFPs to actual collectors.

Even if forest dwellers are aware about the commercial importance of their collected NTFPs, there is a need for more storage and processing centres with various kinds of facilities. Because of the lack of storage centres at the each level of the formal marketing channels, actual collectors are compelled to sell their collected NTFPs to intermediaries at a low price. There are a few storage centres of Ramakrishna Mission and LAMPS, but compared to the total annual collections of NTFPs the capacity is very little. LAMPS collect Kendu leaves and Sal seeds only whereas Ramakrishna Mission storage centres are normally used for medicinal plants. Therefore, forest villagers cannot store their other collected NTFPs in order to wait to achieve a better price. Due to the lack of a proper transportation system, actual collectors cannot go to the LAMPS or Ramakrishna Mission owned storage centres or the town markets often. They try to save the transport cost and time of travelling instead. Middlemen visit villages and village markets to collect NTFPs from them. Therefore, for the enhancement of formal marketing channels, literacy, transportation, storage and processing techniques and opportunities must be developed at the ground level in the dry-deciduous forest area of West Bengal.

The sixth important finding of the research is the lack of knowledge about value-added products. Villagers manufacture some value-added products such as mats made from date leaves, Sal plate making, liquor making from Mahua flower and Bakhar. However, most of these products are sold to middlemen and mobile agents. There are several NTFPs, which are used as industrial raw materials for cosmetics, medicine, decorative, jewellery and so on.

Industrial agents and intermediaries normally collect these products from actual collectors. Often, forest villagers are ignorant of the uses to which their NTFPs are put. For example, every year middlemen ask forest villagers of the Ajodhya hill area to collect different types of bark, but villagers do not know the uses of these barks. They just try to collect according to the demand of intermediaries and are paid Rs. 1 – 2 for a kilo of their collected products. However, when these products are sold to the industrial units, the price is much higher. Once forest villagers know the uses of these products, then they might be able to bargain for a higher price. The knowledge of grading, following the criteria of industrial units, is not clear to most of the forest dwellers. The knowledge of use and grading of NTFPs can improve the market price.

If forest dwellers are trained about the value-added products, then they can earn more money from the same volume of collected products. Thus, the economic status of these marginal people can be improved. Once their economic condition gets better, they may try to shift toward other professions, as the collection of NTFPs is not a very easy task. Consequently, their dependence on forest and forest products can be reduced. The NAEB is planning to focus on ‘small and micro forest enterprise’ for this purpose. In this system, a group of villagers will be collecting NTFPs, others will do grading and value-addition and a group will do the marketing. Individually, forest dwellers may collect a small amount of product, which may not be enough for the manufacturing of value-added products. When value-added products are manufactured, the total weight of the manufactured product is normally less than the total weight of the primary product. Therefore, if forest dwellers are united and form a cooperative society, then the small and micro forest industries might be developed.

After production, the products have to sell at the market with appropriate price. This is also possible when villagers are united. On the other hand, if forest dwellers are not united then villagers will produce a small amount of value-added products individually. Others, who might need money urgently or do not want to take any trouble of marketing of value-added products, will sell the primary products. Ultimately, those villagers, who will be manufacturing value-added product will suffer because they will not be able to compete with manufacturing units. Manufacturing units will try to purchase raw materials from as many villagers as possible. For this purpose, they might even increase the price of primary products sometimes. Merely concentrating on the improvement of knowledge about value-added products will not solve the problem, but, through the development of small and micro level enterprises, villagers have to be united so that the supply of raw material to the manufacturing units is controlled.

The final finding of the research is the absence of any particular policy of the State government regarding the harvesting of NTFPs. Forest fringe dwellers are allowed to collect NTFPs for their domestic needs and to sell a limited amount at the local market without paying any royalty to the Forest Department. However, with the increasing population of forest communities and the expansion of market demand, the unscientific harvesting of NTFPs has also been escalating. The harvesting of NTFPs does not follow the government instructions and restrictions. Therefore, it has become necessary to produce an explicit policy only for NTFPs. Before constructing a NTFP policy, micro level research is required in the dry-deciduous forest area of the State. The intensive research will reveal the human-forest relationships, socio-cultural life style of forest villagers, the different magnitude of dependence on NTFPs of interior forest and forest fringe dwellers. It will then be possible to develop a better policy.

At present, the West Bengal Forest Department is following the JFM Resolution of the Central Government of India regarding the harvesting of NTFPs by forest dwellers. This resolution, however, was constructed from a general perspective for the whole of India. Therefore, several problems arise when this is followed at the ground level. Considering this problem, states like Orissa, Andhra Pradesh, Chhattisgarh have already constructed their own policy on NTFP harvesting (Panigrahi, 2007; Saxena, 2003; Katiyar, 2007). The same initiative certainly can be useful for the Forest Department of West Bengal.

From the overall research findings, it can be said that to make an explicit plan for the systematic harvesting of NTFPs and to reduce pressure on forest resources, comprehensive documentation of available NTFPs is needed. This identification can be achieved through the geographical study of forest based socio-cultural life related to NTFPs (Emery, 1998; Steinberg, 1998; Turner, 2001). Through the study of forest socio-cultural life, forest officers, environmentalists, industrial units and other outsiders will gain an awareness of the availability and use of NTFPs found in the native forest. Based on the availability, quantity and quality of the available NTFPs, the organised marketing channels can be improved. Consequently, forest-based livelihoods can be improved (Torras, 2000; Mendelsohn, 1994; Peters *et al.*, 1989). This way NTFP policies (Nijnik and Van Kooten, 2000; Dufournaud *et al.,* 2000; Chun-Lin *et al.,* 1999; Emery, 1998 and 2001) can be implemented that will be more pragmatic and authentic for the sustainable development of the native forest environment.

Although, research has been conducted on NTFPs and forestry from different perspective, there is a lack of all-inclusive chronological study on forestry and forest culture. Therefore,

this geographical study examined the NTFPs based forest livelihoods and how the native forest might be exploited in a more sustainable way.

11.2 Limitations of the research findings from different socio-economic and environmental aspects

There are some limitations in the research findings. The reasons behind these limitations are geographical as well as anthropogenic. As the research has been conducted in one of the socio-economically backward as well as geo-physically remote areas of India, the availability of data and information was not at all easy. Attempts have been made to manage data and information as much possible from the pre-colonial, colonial including the East-India Company period (1757 – 1857) and post colonial period until now. However, it cannot be said that all the data and information have been referred to in the research. The official data for the pre-colonial and colonial periods have been managed mainly with materials now held in the British Library, London. There are very limited sources of information on the colonial and pre-colonial forestry and forest – people relationships of the dry-deciduous forests of Bengal.

For the post-colonial period, data and information have been collected from several government reports, Forest Department reports, WBFDC and WBTDCC annual reports, reports on project work by NGOs and research organisations, journal publications, books and newspaper articles. However, there is very limited work has been undertaken evaluating the importance of NTFPs in forest socio-cultural life and how these products can take a constructive role in dry-deciduous forest management. Therefore, there are limitations in terms of literature and background information available.

For this research, a three months pilot study and four months full fieldwork have been conducted. Due to the limitations of accessibility within the interior forest area, it is felt that the periods of fieldwork were insufficient. At the same time, a contact had to be maintained with the high ranking Forest Department staffs, who are normally posted in Kolkata, about 150 km away from the research area. The problem of transportation in the field area posed a tremendous problem in terms of completing the research within the scheduled time. During the arrangement for interviews, household surveys and group discussions, a special effort had to put to encourage female and child members to participate. Female and child members have shared their experiences, but still there is a space to improve it.

As the society is socio-economically underdeveloped and the accessibility is very poor so the Maoist activities are quite noticeable in the research area. In fact, during the progress of

fieldwork, a Maoist attack took place on the Cabinet Minister of the Government of India and the Chief Minister of West Bengal in one of the case study districts. Therefore, the Forest Department was not allowing access to interior forest villages without protection. The researcher is thankful to the State Forest Department for their help in this regard. However, the situation adversely affected day-to-day social life and simultaneously this also affected on the research, which was conducted about these communities.

11.3 Implementation of the research findings in similar forest areas

Keeping in mind all the limitations of this research, it can be said that, this research is going to be the first piece of research which encompasses all the aspects of NTFPs, forest livelihoods, and forest management of the dry-deciduous forest of West Bengal. It is true that with the variations in forest features and availability of forest resources, the forest livelihood varies. Even then, the results of this work can be referred to for the similar type of forest research. There are some basic aspects of forestry, forest cultures and in forest management strategy. Therefore, the findings of this research can be used for similar forest areas with a little modification according to the native forest characteristics.

To save the forest ecology, this research has been carried out with special reference to the systematic and sustainable harvesting of NTFPs, available in the dry-deciduous forest of West Bengal. Appropriate harvesting of NTFPs can reduce the dependence on timber products. Illegal timber felling always creates problems in the highly populated third world countries, where thousands of forest communities live within or at the outskirts of the forests. It is because of the poor economic conditions, these forest dwellers cannot manage any other source of fuel. Selling firewood is also a good business for these marginal forest people because the demand of firewood is also higher outside the forest area. Whenever, forest villagers need money, they go to the forest to fetch firewood as they are sure that they will be able to sell it. Therefore, for the management of forest cover it is necessary to control timber collection.

Without offering an alternative source of income to forest villagers, it is very difficult to control timber collection. In this situation, NTFPs can take an important role in protecting the forest cover, providing an alternative source of income for forest dwellers. The research has analysed the collection strategies, storage facilities and formal and informal marketing channels to enhance the systematic harvesting of NTFPs from the ground level to the ultimate purchasers. The idea, themes and findings can be useful for the improvement of socio-economically weak forest communities of tropical and sub-tropical countries.

The economic development of forest people could help to protect the forests of West Bengal. The introduction of government policies is not enough in this regard. It has to be ensured that these policies are working intensively for the fiscal growth of forest people (Mahapatra and Mitchell, 1997). A sense of ownership over forest resources including NTFPs could inspire forest dwellers to protect the forest ecology of West Bengal. Proper education regarding the importance of forests and forest products directed through *Gram Panchayat* or *Gram Shabha* (village level government body) institutions could help to increase the consciousness among tribal people. It is, however, also true that as the forest people have been living in these forest areas for centuries. They know better than outsiders about how they should collect, which products they should collect and how much they should collect.

11.4 Further research

The present research mainly focuses on NTFPs, excluding animal products. In future, however, animal products can also be included. Research can also be conducted on other social aspects of forest communities. No doubt, the forest has an important role in the life of forest communities, but the action is not always one way. Forest communities' activities also manipulate the forest environment. There are several socio-cultural practices among forest communities. In general, these practices are not related to forest directly, but in broad sense, there might be associations.

Therefore, forests and particularly those in which people live should not be studied only from the aspect of forestry, but at the same time, forest communities should receive equal priority. For the overall improvement of forest resource management and marginal forest dwellers' socio-economic circumstance, research is needed that combines historical, development, economics, environmental and policy making perspectives. The discovery of the historical aspects of human-environment interactions and the study of contemporary socio-economic issues related to forest and forest products harvesting can be considered to be important features in terms of future substantial policy making. This research intended to combine different geographic aspects to present an overall idea about organised natural resource harvesting and marginal livelihoods in terms of NTFPs, available in the dry-deciduous forest areas of West Bengal.

The basic problems in the case of sustainable natural resource harvesting and management are quite similar to other countries of the Global South. Thus, the findings generated from this research might be also useful for the socio-economic improvement of deprived communities, who are involved in the production of other natural resources.

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Appendix

Appendix (1): Questionnaires

Questionnaire for the research on

NTFPs in West Bengal: Knowledge, Livelihoods and Policy

Survey conducted
by
Somnath Ghosal
School of Geography, The University of Nottingham, UK.

Household schedule

Household ID No. -

1. Identification of sample village

1.1	Name of the district	
1.2	Sector 1=Municipality, 2 = Gram Panchayat, 3= Forest	
1.3	Name of the village	
1.4	Police station	
1.5	Jl. No.	
1.6	Type of settlement 1= Nucleated, 2= Linear, 3= Scattered	

2. Identification of sampled household and the respondent

2.1	Name of head of the sampled household	
2.2	Address	
2.3	Name of interviewees	
2.4	Sex of respondent - 1= Male, 2= Female	
2.5	Age of respondent < 20, 20-40, 40-60, >60 (in years)	
2.6	Respondent's relationship with head of the household	

3. Characteristics of the household

3.1	Type of household 1= Single, 2= Nuclear, 3= Joint	
3.2	Mother tongue 1= Bengali, 2= Santhali, 3= Hindi, 4= Others (specify)	
3.3	Religion of household 1= Hindu, Muslim= 2, Christian= 3, Others= 4 (specify)	
3.4	Social group/community (*Jati*) ST= 1, SC= 2, OBC= 3, Others= 4 (specify 3 & 4)	
3.5	Name of the original place from where the household has come.	
3.6	Is the original place 1= forest or 2= non-forest area	
3.7	How long the household have been living at the present address: 1= < 10, 2= 10-20, 3= >20 (in years)	
3.8	Household homestead land ownership 1= Urban and 2= Rural areas (if both, write 1&2)	
3.9	Amount of household's homestead land ownership in rural area (in Cottahs/Bighas; 1 Bigha= 20 Cottahs)	
3.10	Amount of household's homestead land ownership in urban area (in Cottahs/Bighas; 1 Bigha= 20 Cottahs)	
3.11	How much homestead area do they use for cultivation?	
3.12	Household cultivated land ownership (in Cottahs/Bighas; 1 Bigha= 20 Cottahs)	
3.13	Type of homestead/cultivated land possession 1= Owned, 2= Owned by Relations, 3= Others (specify)	

4. Features of household members

Sl. No.	Relations with HOH	Sex	Age	Educational qualification	Language speaking	Marital status				Occupation			Individual average income/ month	Individual average expenditure/ month
						Unmarried	Married	Widowed	Divorced	Primary	Secondary	Others		
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

* HOH – Head of household

5. Knowledge of NTFPs of household members

Sl. No.	NTFP Species	Parts of species used as NTFPs *** (L/F/S/ Fl/B/R/T/St /G/F/ W/P/I/O)	Type of forests from where it is being collected *(RF/PF/ OF)	Distance from the household and the place, from where the NTFP is being collected	NTFP collected by				Months in which NTFP is being collected **** (J/F/ M/A/My/Jn/Jl/Ag/S/O/N/D)	Purpose of NTFP collection			Amount of the collected products (Approx.)		
					M	F	C	Aged people (specify **M/F)		House-Hold (Fd, Fdd, Co,De, Hhl &H, Ot)	Comm-ercial (Rmci, Rmbi, Ot)	Both	House-hold	Comme-rcial	Total
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

*RF – Reserved Forests; PF – Protected Forests; OF – Open Forests;

** M – Male; F – Female, C – Child Hut [a] - (Market)

*** L- Leaf, F- Fruit, S- Seed (oil), Fl- Flower, B- Bark, R- Root, T- Tanning & Gum, St- Stem, G- Grass, F- Fibre, W- Wild vegetables & tuber, P- Pod, I- Insect products, O- Other

**** J- January, F- February, M- March, A- April, My - May, Jn- June, Jl- July, A- August, S- September, O- October, N- November, D- December

***** Fd - Food, Fdd – Fodder, Co – Cosmetic, De - Decorative, Hhl &H – Household and House making, Ot – Other (specify); Rmci – Raw material for cottage ind. , Rmbi – Raw material for big ind., Ot – Other (specify)

7. The variations in collection of NTFPs in different moths (Use PRA to establish this – Matrix ranking)

Sl. No.	Name of NTFPs	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

Status of collection: * 1 – Maximum, 2- Moderate, 3- Low, 4- Nil

8. Monthly income of the household from NTFPs, agriculture and other sectors

Sectors of work	Months												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
NTFPs													
Agriculture													
Wage-Labour (Incl. Agr)													
Others													
Total													

9. Storage of NTFPs

9.1 How are the collected NTFPs stored? If stored in the warehouse then answer 10.2. If in the 'own house' then go for 10.7.

9.2 Is there any government, NGO or private storage facility for NTFPs?

9.3 How far is the warehouse from the village?

9.4 How far is the warehouse from the local hat (market)?

9.5 Do you pay for NTFPs storage? If yes then answer 10.6. If No, then go 10.7.

9.6 How much do you pay for the storage of NTFPs per month?

9.7 What transport system do you use to bring the collected products to the warehouse/own house?

9.8 What transport system do you use to take NTFPs from warehouse/own house to the market for selling?

10. Marketing of NTFPs

10.1	Are the NTFPs sold by 1= household head only, 2= actual collector, 3= any household member	
10.2	To whom do they sell their collected NTFPs: 1= govt. org., 2= middlemen/agents, 3= NGOs, 4= traders at the local market (*hat*), 5= customers at the local market, 6= Other (specify)	
10.3	Are they paid in 1= cash, 2= commodity, 3= by other means (specify)	
10.4	How far is the market where NTFPs are sold by actual collectors or agents 1= < 5, 2= 5 – 10, 3= 10 - 15, 4= 15-20, 6= >20 (km)	
10.5	How does the actual collector go to the market 1= walking, 2= bus, 3= cart, 4= others (specify)	
10.6	Do the agents/middlemen come to the actual collector's house to buy NTFPs 1= yes, 2= no, 3) Some times	
10.7	If middlemen/agents come, then how often: 1= everyday, 2= once in a week, 3= once in a month, 4= other (specify)	
10.8	Do middlemen/agents pay 1= less price than the govt. price, 2= same as of the govt. price, 3= more than the govt. price. (if less than govt. price than specify how much and for which product).	
10.9	How the actual collector is being informed of the market price of NTFPs 1= from forest office, 2= from radio/TV/news papers, 3= from agents, 4= others	

10. 10 What are the problems actual collectors face during the time of selling of NTFPs?

10.11 Do they get any government assistance for the selling of NTFPs? If yes, then answer 11.12. If No, then go for 11.13

10.12 What type of help do they receive?

10.13 Do they like to sell their collected products to agents/middlemen than the govt. organisations? If yes then why?

10.14 Do they make any 'value-added' products from their collected NTFPs?

10.15 Do they sell 'value-added' products to the market directly? If Yes, then how?

10.16 If not then why?

10.17 Does the interviewee have any idea of exporting of NTFPs to other states or countries?

11. Policies on NTFPs

11.1Do the actual collectors know of any govt. policies regarding collection, storage and marketing of NTFPs?

11.2 How have they been informed those policies?

11. 3 Is the implementation of govt. policy regarding the operation of NTFPs changing their socio-economic condition?

11.4 Does the collection of NTFPs affect the local forest? If yes, then answer 12.5. If no then go for 12.6.

11.5 How does the collection of NTFPs affecting the local forest?

11.6 How could the collection of NTFPs help to protect local forest?

11.7 From which forest areas (RF, PF, OF) should the collection of NTFPs be done?

11.8 How can the govt. make the collection of NTFPs more organised and profitable?

11.9 Does government arrange workshop, seminar or exhibition regarding identification, collection, storage or marketing of NTFP?

Important notes of the interview - details socio-economic status

Signature of the interviewer: Date:

Focus group (for forest officers/forest dwellers) discussions for the research on NTFPs in West Bengal: Knowledge, Livelihoods and Policy

Discussions arranged
by
Somnath Ghosal
School of Geography, The University of Nottingham, UK.

No. of focus group:

1. Identification of participants

Name of the participator (could be alternative)	Name of the village/office	Gender	Age group (1= < 20, 2= 20-40, 3= 40-60, 4= >60 (in years))	Designation (occupational position)

2. Knowledge of NTFPs

2.1 What is the meaning of NTFPs to participants?

2.2 From which forest areas (RF, PF or UF) are NTFPs collected mostly?

2.3 What are the most important NTFPs collected from the study area?

2.4 During which months are the collection of NTFPs increased and why?

2.5 During which months are the collection of NTFPs less and why?

2.6 How NTFPs are related with the social life to forest people? *

2.7 How much NTFPs are important in the cultural life to forest people? *

2.8 How NTFPs are used for medical purposes by forest dwellers? *

3. Collection of NTFPs

3.1 Which NTFPs are collected for domestic purposes in the study area?

3.2 Which NTFPs are collected for commercial purposes in the study area?

3.3 Which NTFPs are important for both purposes in the study area? *

3.4 Is there any govt. help forest community can get for the collection of NTFPs? How?

3.5 Is there any govt., NGO or private controlled storage facility for the collected products in the study area?

3.6 Does the govt. arrange any workshop, seminar, exhibition regarding the identification, collection and storage of NTFPs in the study area? If yes, how often and where?

4. **Marketing of NTFPs**

4.1 Which NTFPs are marketed though govt. organisations, agents/middlemen and by both?

4.2 Is there any govt. rule regarding the marketing of NTFPs?

4.3 How far is the market, where NTFPs are sold, from forest village? *

4.4 How are the prices of NTFPs decided?

4.5 How are the prices of NTFPs being informed to forest people? **

4.6 Is the price of NTFPs varying between govt. organisation and agents/middlemen? If yes, then how much?

4.7 How do middlemen/agents influence actual collectors to sell NTFPs to them?

4.8 How do middlemen/agents pay for NTFPs to actual collectors? *

4.9 What are the transportation facilities available for the marketing of NTFPs from the actual collection area to the formal market?

4.10 Does the govt. arrange any discussion on the marketing of NTFPs with actual collectors? If yes, then how often and where?

4.11 How could the formal marketing system save actual collectors from the exploitation by middlemen/agents?

4.12 Has the govt. forest department taken any initiative to stop middlemen/agents to stop from illegal marketing of NTFPs?

5. Policy regarding NTFPs

5.1 Is there any [West Bengal or India] govt. policy regarding identification, collection or marketing of NTFPs? **

5.2 How could the govt. officers identify all the NTFPs with the help of forest dwellers of the study area?

5.3 What measures can govt. take for the systematic collection of NTFPs by forest dwellers?

5.4 How can govt. expand the storage facility of NTFPs in the study area?

5.5 How can govt. involve forest people directly in the marketing of NTFPs?

5.6 How could NTFPs be used for the overall socio-economic progress of forest people?

5.7 How could the systematic operation of NTFPs control the degradation of open/protected forest areas of the study area?

5.8 How can NTFPs help to reduce the encroachment of forest in the study area?

5.9 How could systematic operation of NTFPs be helpful to protect forest ecosystem of the study area?

* Questions will be asked only forest dwellers

** Questions will be asked forest officers only

Elite (forest officers/ community leader) interviews for the research on NTFPs in West Bengal: Knowledge, Livelihoods and Policy

Interviews conducted
by
Somnath Ghosal
School of Geography, The University of Nottingham, UK.

Elite Interview No. -

Identification of the interviewee

1.1	Name of the interviewee	
1.2	Address (office/organisation/community)	
1.3	Sex of respondent - 1= Male, 2= Female	
1.4	Age group of respondent < 20, 20-40, 40-60, >60 (in years)	
1.5	Designation of the respondent	
1.6	How long s/he has been in the concerned office/organisation/community?	
1.7	How long s/he has been in the concerned post?	

2. Knowledge of NTFPs

2.1 What is the meaning of NTFPs to the interviewee?

2.2 From which forest areas (RF, PF, UF) NTFPs are collected mostly in West Bengal?

2.3 What are the most important NTFPs collected from the study area?

2.4 Which family member collects which type of NTFPs and why? *

2.5 During which months is the collection of NTFPs increased and why?

2.6 During which months is the collection of NTFPs minimum and why?

2.7 How are NTFPs related to the social life of the forest people? *

2.8 How much are NTFPs important in the cultural life to the forest people? *

2.9 How are NTFPs used for medical purposes by the forest dwellers of the study area? *

2.10 How are NTFPs important to the forest people for economic purposes?

3. Collection of NTFPs

3.1 Which NTFPs are collected for the domestic purposes in the study area? *

3.2 Which NTFPs are collected for the commercial purposes in the study area? *

3.3 Which NTFPs are important for both the purposes in the study area? *

3.4 How and by which family member the medicinal herbs are being collected? *

3.5 Do the forest people store medicinal herbs for future sell? If yes, then how? *

3.6 Is there any govt. help forest communities avail for the collection of NTFPs? If yes, how?

3.7 Is there any govt., NGO or private controlled storage facility for the collected products in the study area?

3.8 Does the govt. arrange any workshop, seminar, exhibition regarding the identification, collection and storage of NTFPs in the study area? If yes, how often and where?

4. **Marketing of NTFPs**

4.1 Which NTFPs are marketed through govt. organisations, agents/middlemen and by both?

4.2 Is their any govt. rule regarding the marketing of NTFPs?

4.3 How far is the market, where NTFPs are sold, from the forest village? *

4.4 How are the prices of NTFPs decided?

4.5 How are the prices of NTFPs being informed to the forest people?

4.6 Is the price of NTFPs varies between govt. organisation and agents/middlemen? If yes, then how much?

4.7 How do middlemen/agents influence the actual collectors to sell NTFPs to them?

4.8 How do middlemen/agents pay for NTFPs to the actual collectors?

4.9 What are the transportation facilities available for the marketing of NTFPs from the actual collection areas to the organised market? *

4.10 Does the govt. arrange any discussion on the marketing of NTFPs with actual collectors? If yes, then how often and where?

4.11 How could the organised marketing system save actual collectors from the exploitation by middlemen/agents?

4.12 Has the govt. forest department taken any initiative to stop middlemen/agents?

5. Policy regarding NTFPs

5.1 Is there any govt. policy regarding identification, collection or marketing of NTFPs?

5.2 How could the govt. officers identify all the NTFPs with the help of forest dwellers of the study area?

5.3 What measures govt. can take for the systematic collection of NTFPs by the forest dwellers?

5.4 How can govt. expand the storage facility of NTFPs in the study area?

5.5 How can govt. involve forest people directly in the marketing of NTFPs?

5.6 How could NTFPs be used for the overall socio-economic development of the forest people?

5.7 How could the systematic operation of NTFPs control the degradation of open/protected forest areas of the study area?

5.8 How can NTFPs help to reduce the encroachment of forest in the study area?

5.9 How can systematic operation of NTFPs be helpful to protect forest ecosystem of the study area?

* Questions will be asked to forest dwellers only.

Appendix (2): Report on participatory appraisal

Arsha Range, Purulia Division, Purulia District Date – 22-09-2008 – 15-10-2008

Village – Bhuda Date – 22-09-2008 – 25-09-2008

The village is located in the Ajodhya hill area. It is covered with forest in all sides. The forest is of miscellaneous type. The nearest local market is at Sirkabad, about 5km from Bhuda village. It is a village market. Normally once in a week villagers go to this market to sell their collected forest products and to buy necessary household stuffs.

At least one person from each household enters the forest everyday to collect firewood, fodder and other domestic products. The researcher went into the forest with native villagers for three consecutive days. Villagers typically follow the short-cuts to enter into the forest so that they can cover a large area within a day to maximise the amount of collected forest products. It was quite difficult for the researcher to follow them. As it is a miscellaneous forest with different types of plant species of different heights so the forest is quite dense and the forest floor is covered with bushes, ferns, lianas etc. For the researcher it was quite difficult to walk.

The researcher had planned to visit the forest for at least a week, but villagers recommended to stay within the village and not to go with them due to the risk of flash floods of the monsoon. Flash flood is very common in this hilly area. After sudden heavy rainfall (as September is the end of monsoon, the rainfall is relatively irregular) water flows from the top of the hill, the overflow can inundate both the embankments of channels. This flash flood also affects livestock, which forest villagers keep in the hilly forest area for feeding. Forest villagers are quite well prepared for such situations and know where they can take shelter.

The researcher decided to visit the village this time because after finishing agricultural plantation (paddy) in their own field or working as wage labourers in others' (within the district or even in other districts) they come back to their village and go to collect forest products. Several types of leaves, rhizomes, roots, fruits are available during this time so the number of collected NTFPs is also higher. Between June and August, because of the agricultural work and continuous rainfall villagers cannot collect or store firewood, therefore the fuel runs out during September. That is why villagers get to go for the collection of firewood as well. These all created interests to the researcher to visit the forest villages of Purulia district during this period.

After having a heavy breakfast villagers usually enter the forest in a group. Members from different households go together. Normally they do not go alone. Going in groups helps them to collect larger amount of forest products and it also helps them to protect themselves from several potential problems. Male members can cover 9 km² forest areas in a day, while female members can cover at least 4 km² areas. Female members hardly go for new areas, where they have not visited earlier, for the collection of forest product.

Collection of firewood or some amount of fodder is must for them everyday; however, they collect other seasonal products for the household or commercial purposes. When they start in the morning, they cannot estimate or predict that which product they are going to get and how much they will be able to gather. It is purely depend on their 'luck'. If they are lucky they can get a bulk amount of product within a short distance, and if not, then it may waste the whole day without any collection. Therefore, when they start they mainly go for the collection of fuel wood and fodder, which is available in abundance.

Tuber roots, rhizomes, which are grown under the surface soil, or those leaves or fruits are collected from the big trees are mainly collected by the male members. Women and children collect leaves, fruits and flowers which have fallen to the floor. Both parties collect firewood. They use a typical type of long bamboo with sharp knife at one end with which they collect dead branches as fuel, fruits, flowers, and leaves for fodder. Normally children go with elder family members. Elder family members climb on the tree to collect forest products and children heap those products on the floor.

Dwellers of Bhuda village are usually collect forest products for their domestic needs. So once they get any product according to their household demand, they just come back from the forest. Even they do not collect firewood to sell at the market; they collect only according to their household need. Most of the villagers expressed their anxiety to the researcher that villagers from the forest fringe areas come to collect firewood and timber and they sell those products at the market. Accordingly, the forest area is degrading day by day and they are not getting lots of other NTFPs, which were available before.

For household requirements, some NTFPs are collected as medicine following the local doctor's (*Kabiraj*) prescriptions. Most of the time the doctor bring these NTFPs to produce medicines. Forest dwellers do not know the uses of these medicinal herbs or how the doctor makes a single medicine using several plant species. Some common NTFPs, which are use for medicinal purposes, are collected by the elder male family members otherwise these plants are collected by the doctor.

It was quite surprising to the researcher that some NTFPs are not collected by female members due to some superstitious believes. These are only collected by male members. Some products are collected only after ritual performance; whereas, some are collected only during the day time not in the afternoon.

Villagers go into the forest by walking; they do not use any bicycle or any other vehicle within the forest. They come back home before sunset because of the presence of wild animals and some superstitious beliefs.

Village – Sirkabad-Bhelaidih Date – 26-09-2008 – 05-10-2008

Sirkabah and Bhelaidih are two separate villages located very near to each other. Sirkabad is a big village including a few communities. Communities are based on casts and religions. People from this village work in different sectors including government services, small business etc. The average economic status of the villagers of Sirkabad is well off compared to the other three villages, where the researcher visited for the field work purpose. About 30% of the residents of this village are purely dependent on NTFPs collection; whereas, almost all households of Bhelaidih village are dependent on forest products collection. They also work as wage labourer. Bhelaidih is a tribal village.

Villagers from these two villages usually collect NTFPs to sell at the Sirkabad local market. Therefore, compared to Bhuda villagers these two village people are professional minded regarding the collection of NTFPs. Normally, on one day they collect forest products and the other day they sell their collected product at the Sirkabad local market. They go to the forest by walking but when they go market they normally cycle. Female members also go to the Sirkabad local market to sell their collected NTFPs.

As these two villages do not only collect NTFPs for domestic use, whatever amount they get they bring to their home that is not needed is sold at the local market. They try to collect as much forest product as they can carry on their head and it continues until dusk. This was an important difference between the villagers between the villagers of Bhuda and Sirkabad-Bhelaidih.

Even to save time and to collect more products villagers of Sirkabad-Bhelaidih sometimes collect whole plants rather than the important parts of the plant, which are used as NTFPs. Although carrying a bulk amount of product is not an easy task, they do not want to waste their time for grading or shorting for the collected forest products in the forest.

When mobile agents, middlemen, NGOs or any other organisation asks these villagers to collect any particular products, villagers try to collect more product than other villagers to earn better money.

These two villages do not wait for any ritual festival or performance before collecting any particular forest product, unlike villagers of Bhuda. Firewood is collected by male as well as female members whereas, fodder, leaves, some fruit and flower, which are fallen on floor, are collected by female and child members. As the forest is quite far from these two villages, villagers normally start early in the morning and they come back in the afternoon. Sometimes they also take their cattle into the forest to feed them. It also helps them to carry some more products while they come back.

Village – Kalaboni Date – 06-10-2008 – 10-10-2008

The distance of forest as well as the local market from Kalaboni village is same. It is about 3km. Surprisingly, Kalaboni villagers collect only three products from the forest area. These are firewood, Sal leaves and Gethi alu. As it was the season of Gethi alu production so villagers were going to collect this tuber root. Normally male family members collect this product as it needs to dig the surface soil to find out the product. Female members also go sometimes to collect it. The villagers usually go for the collection of firewood and Sal leaves and at that time if they find tuber products then they collect these too. However, they do not set out for the collection of this product only. As the main profession of these villagers is selling firewood and Sal plates they go for the collection of these two products, even during monsoon. Women and children go to collect Sal leaves, whereas men collect firewood. During the collection of Sal leaves they brush the forest floor to dump Sal leaves at a point and then they put it in a big bag to carry those Sal leaves to their home. Both sex go into the forest on foot.

During monsoon most of the villagers work as agricultural wage labourer and because of the wet weather it is quite difficult to dry firewood and Sal plates. However, people stay in the village, still collection these two products. Though Kalaboni villagers are all Schedule Tribe and live just 3km away from the forest even then they are not much more intimate with their forests like the Bhuda villagers. It is just for their profession that they go to the forest. Even the significance of the forest in their social or cultural life is less.

They go in the morning to collect firewood and Sal leaves and carry as much as they can. They collect these products until the dusk. Sometimes, if they do not get dead branches they cut green trees to make firewood. Illegal timber marketing is also done by some of the

villagers if they do not get enough firewood or Sal leaves. According to the villagers there is not enough NTFPs for them to sell at the local market on a regular basis.

Village – Gurahata Date – 11-10-2008 – 15-10-2008

The village of Gurahata is located in the forest fringe area. There are about 130 households in the village, among them 50% are entirely dependent on forest products collection. Most of the products they collect are for domestic as well as commercial purposes. With the collection of firewood and Sal leaves they also focus on other seasonal NTFPs. Any product they collect for their domestic needs is sold at the local market of Sirkabad, which is about 2 km away, if it is surplus to their need. The villagers of Gurahata are more intimately connected to their forests compared to Sirkabad-Bhelaidih and Kalaboni villagers.

Ranibandh Range, Date – 25-10-2008 – 11-11-2008

Bankura South Forest Division, Bankura District

Village – Jamdaha Date – 25-10-2008 – 31-10-2008

The fieldwork in Bankura district was conducted in late autumn. After the monsoons, people return from agricultural activities and start collecting forest products before they continue crop harvesting, which they plant during monsoon. So the type and amount of forest product collection, including firewood, increase in the months of October and November.

The fieldwork was conducted in Ranibandh block of the District. Physiographically, it is an undulating terrain with red soil cover. Jamdaha village is located within the forest area about 10 km away from the Ranibandh local market. There are two communities in the village including a total of 19 households. All the villagers are tribal and forest has an important role in their life. About 58% of the forest products they collect are for domestic as well as commercial purposes, whereas, 19% purely for commercial and 23% for domestic uses only (source: based on fieldwork).

Normally men collect firewood, roots and some fruits; whereas, women and children collect leaves, fruits and flowers which are dropped to the surface. Barks and roots are collected by male as well as female members.

After having a hefty breakfast (usually rice), they go for the collection of forest products. Collection continues until they can carry no more. Normally they carry their collected products on their head. They do not take any bicycles or any other vehicle when they go into

the forest. However, when they go to the local market to sell their collected products they occasionally use bicycles. If they do not get any fruit, bark, flowers or any other NTFPs, which have a market value or domestic importance, then they do at least bring back some leaves or firewood to use for fodder or fuel. Numerous types of NTFPs are collected by these villagers, although it varies from one season to another. They use some NTFPs for multiple purposes. For example, other forest villagers use Sal leaves for plate making, while, Jamdaha villagers also use it for making *bidi* (cigarettes), which is locally known as *chuti*. They also use oil, produced from mahua seed (*kachra*), for cooking as well as some other purposes. The wax created during the time of oil producing has multiple uses.

Economically their condition can be described as 'hand to mouth'. Except agricultural seasons they do wage-labouring jobs but there are no more than 100 days when such jobs are available per year. As at least one family member from each household is a member of Forest Protection Committee (FPC), so sometimes they are employed by the Forest Department for scheduled felling or plantation. They also get the 25% of the net profit from timber marketing. Nobody in the village is working in the government or any other organised sector.

The researcher visited the village for a week to conduct household survey and for participatory appraisal. A walk with villagers to categorize the areas was also arranged from where male, female and children collect forest products. In late autumn, the sun sets earlier so people were also going for forest product collection earlier in the morning. During this time they could collect forest products for the whole day, moving around a large forest area. However, in summer they become tired sooner as the area is lateritic and the day temperature can become very high in the afternoon.

Most of the collected NTFPs are purchased by middlemen or mobile agents from the village itself. Very few products villagers go to sell at the Ranibandh local market themselves. Any family member can sell the collected forest products from their home or going at the market. When they sell their collected products from their house they get comparatively lower prices than the local market. However, they like to sell their collected products from village because it saves them time which they can use to collect more products. The road from the village to Ranibandh local market is not at all good. During monsoon access is incredibly difficult. Villagers lament the fact that they do not get any facility from any other government office except the Forest Department. The Forest Department made some village paths and a bridge there and also setup a tube well in the village for drinking water.

Village – Barudi Date – 01-11-2008 – 06-11-2008

The next village, I visited in Ranibandh block is Barudi. The villagers' economic condition is better compared to Jamdaha villagers. A few of them are even working in organised sectors. Most of the villagers own their agricultural land, although the amount of land is very little.

However, majority of the villagers are still dependent on forest products collection. It is for both domestic and commercial purposes. Firewood is the only source of fuel for these villagers.

The village was visited in late autumn or early winter. It is harvesting period for several fruits. Haritaki, Bahera, Amlaki are collected this time. The Ranibandh local market is about 6 km away from Barudi village so villagers normally go to the market to sell their collected products. From there consumers, middlemen or mobile agents collect these products. Sal plates are mainly purchased by middlemen or mobile agents from the village itself. At least thrice in a week intermediaries visit villages to collect Sal plates. As the village is about 1 km away from the forest area, people collect comparatively fewer forest products compared to Jamdaha villagers. In addition, they mainly collect those forest products, which have commercial importance.

Village – Katiam Date – 08-11-2008 – 11-11-2008

The last village in the Block, which was surveyed, is Katiam. About 20 households out of total 134 were surveyed for this research. The village was visited from 8th of November till 11th of November 2008. It's a mixed community village. The working folk of the village are engaged in different organised as well as unorganised sectors.

The distance of the village to the nearest local market and forest is same about 3km. Normally villagers collect firewood and leaves for fuel and fodder but whenever any mobile agent or middleman ask for any other products, especially medicinal herbs, they collect those products. The Ramakrishna Mission Lokasiksha Parisad and LAMPs have their own collection and marketing centre in this village. The Ramakrishna Mission normally collects different types of medicinal plants whereas, LAMPs business is focused on Kendu leaves and Sal seeds.

As the local market is quite close to the village, villagers also go to the local market to sell their collected products. The collection and marketing of NTFPs in the village is quite organised because of the involvement of two government or government recognised organisations.

Jamboni Range, Date – 15-11-2008 – 20-12-2008

Jhargram Forest Division, West Midnapur District

Village – Dakshinsol Bhaluka Date – 15-11-2008 – 26-11-2008

In West Midnapur district the nature of forest is quite different from Purulia or Bankura district. Here forests are mainly Sal dominated. Forest with miscellaneous species is very rare. This is the main reason why forest villagers are involved in Sal plate making. The lack of other NTFP produced species has limited the marketing opportunity of NTFP business. Kendu is another important NTFP collected by forest fringe villagers of West Midnapur district.

The first forest village surveyed in West Midnapur district was Dakshinsol-Bhaluka, which is located in Jambuni range. The total number of households in village is 106. Most of the them are considered Other Backward Class. A few tribal families are also in the village. Socio-economically, villagers can be categorised as marginal. Apart from Sal leaves and Kendu leaves, Mahua flower is another important NTFP for these villagers. Mahua flower is collected during March – April for commercial as well as domestic purposes. Another important NTFP is mushroom which is available during June to August. The major income for this villagers come from Sal plate making. Almost every household is involved in Sal plate making for commercial purpose.

Women and children are mainly responsible for the collection of Sal leaves and Kendu leaves, whereas, Sal seeds, Mahua flowers, mushroom are collected by all members. The village is located within the forest area and the distance from the local market is about 9km. There is no LAMPS collection or storage centre in the village or within 10 km, so forest dwellers usually sell their collected Kendu leaves to mobile agents. Normally villagers visit the market twice or thrice per week to sell their collected NTFPs and for purchacing their household needs and other products. Middlemen or mobile agents make several visits per week to purchase Sal plates.

Villagers normally go into the forest to collect Sal leaves and other forest products including firewoods in the early morning after having their breakfast. At least one member from each household goes to the forest everyday in a group with other household members. Other household members make Sal plates in the house or go for some other jobs. With the forest area decreasing, the availability of forest products is decreasing too. Therefore, villagers need to cover a larger area of the forest to fulfil their basic demand. Apart from the collection

of forest products, most of the working people of the village do wage-labour jobs. Although this village is located within the forest area, most of the forest products (mainly Sal leaves) are collect for commercial purpose unlike Purulia or Bankura districts' interior forest villagers.

Compared to Purulia or Bankura districts forest dwellers, very few NTFPs are collected by West Midnapur frest dwellers. Sal leaves and firewood are normally collected all throughout the year. Some other NTFPs are collected from the native forest, but mostly they are seasonal.

Village – Harinaganj Date – 01-12-2008 – 06-12-2008

After having a break for one week due to a sudden increase of Maoist insurgency in West Midnapur district, the fieldwork started at Harinaganj village. This village is located within the Jamboni block about 2 km away from Dakshinsol-Bhaluka village. It is a forest fringe village. The main collected NTFP for these villagers is Sal leaves for making plate. The village is within half a kilometre of the forest and the distance from the local market of Jhargram is about 12km.

About 15 households were surveyed from this village. During winter, due to the lack of flowers, fruit and leaves, Sal leaves and some amount of roots are collected by this villagers. They collect roots only when middlemen place an order. Apart from these two products they also collect *Bakhar*, which is used for liquor making. During autumn several festivals are celebrated by Hindu as well as tribal people, when the demand for liquor increases. As a result, the collection of Bakhar also increases. The whole plant is used for making liquor. The Sabar (tribal) people are well-known for Bakhar collection.

The researcher arranged for a walk in the native forest area with Dakshinsol and Harinaganj villagers to identify the collection area, collected products and the way of collection. Apart from Sal leaves, Bakhar and firewoods other products are normally collected for domestic needs. During autumn and early winter, mushrooms are collected for domestic as well as commercial purposes. There are different types of mushrooms collected from the local forest by male, female as well as children. Mushrooms, which are bigger in size, are sold for higher prices. Selling mushrooms, villagers purchase clothes for their festivals. They also use the same money for other domestic needs during festivals. Therefore, mushroom harvesting is very important for these villagers. There are lots of Eucalyptus trees in the native forest, but there is no market for its seeds so villagers do not collect it. Although, eucalyptus seeds can be used as industrial raw material for producing lubricating oil, cosmetics and other industrial products.

Village – Kendua Date – 07-12-2008 – 11-12-2008

The socio-economic condition of these villagers is comparatively well-off compared to other three researched villages of the Block. Some of the villagers have their own cultivated land and some are involved in small business and other wage labouring jobs. However, at least one household member from most of the families will visit the forest for the collection of firewood. Firewood is the main source of fuel for cooking and other domestic uses. Some villagers also collect firewood to sell at the local market.

The village is about one and half kilometres away from the forest area and the distance from the nearest local market of Jhargram is about 8 km. As the village far from the forest, villagers normally collect those products, which have a higher market value. They get very few NTFPs for domestic use or to sell at the local market. That is why the collection of firewood for commercial purpose is higher in this village compared to other three villages.

Village – Shushni Date – 15-12-2008 – 20-12-2008

The last village that was surveyed in West Midnapur district is Shushni. About 15 households of the village had taken part in surveys, interviews and group discussion. The village is located within the forest area, but few households possess cultivated land outside the forest area. The main cultivated NTFPs for these villagers are Sal leaves, Sal seeds, Kendu leaves and mushrooms. A few types of roots are also collected for household needs to produce medicine. No organisation or agencypeople come here to collect roots, so villagers do not collect for commercial purpose. Villagers are worried about the reduction of the native forest area. It is because with the thinning out of the forest area, the amount and type of NTFPs also reducing.

Older people can speak about lots of NTFPs which they used to collect before for their household needs, medicinal and other purposes, but young family members do not know as much about those products. Some have never seen some of the products in the native forest. Thus, knowledges regarding these products are at risk of being lost. The village is about 9 km away from the local market of Jhargram so villagers do not go to sell their collected NTFPs, particularly Sal plates, at the market. Middlemen visit very often to purchase these products.

Appendix (3): Tabular datasets based on empirical work

NTFPs collection calendar for Bhuda village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Amlaki	*Emblica officinalis*	Fruit												
2			Leaf												
3	Anantamul	*Hemidesmus indicus*	Root												
4	Bahera	*Terminalia bellerica*	Fruit												
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root												
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes												
7	Ban-pui	*Basella alba*	Leaf												
8	Bel	*Aegle marmelos*	Fruit												
9			Leaf												
10	Bhela	*Semecarpus anacardium*	Fruit												
11	Dangua pan	*Smilex macrophyla*	Bark												
12	Dhatki	*Woodfordia Furticosa*	Flower												
13	Gethi-alu	*Dioscorea sp.*	Tuber root												
14	Ghentu	*Typhonium trilobetum*	Flower												
15	Haritaki	*Terminalia chebula*	Fruit												
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark												
17	Jam	*Syzyguim cumini*	Fruit												
18	Kachu saag	*Colocasia esculenta*	Leaf												
19	Kalmegh	*Andrographis paniculata*	Leaf												
20	Kanakendi (Arjun)	*Terminalia arjuna*	Bark												
21	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf												
22	Kend	*Diospyros melanoxylon*	Fruit												
23			Leaf												
24	Khar grass	*Cucumis sativus*	Leaf												
25	Kukui-alu	*Dioscorea sp.*	Tuber												
26	Kul	*Zizyphus jujube*	Fruit												
27	Mahua (*Mahul*)	*Madhuca indica*	Flower												
28	Mushroom	*Agaricus bisporus*	Plant												
29	Paina lata	*Bauhinia volubilis*	Leaf												
30	Panja-alu	*Dioscorea sp.*	Tuber												
31	Piyal	*Buchanania lanzan*	Fruit												
32	Sal	*Shorea robusta*	Leaf												
33			Flower												
34			Gum												
35	Sushuni-alu	*Dioscorea esculenta*	Tuber root												
36	Telhe	*Sterculia urens*	Bark												
37	Thara-alu	*Dioscorea sp.*	Tuber root												
38	Tilai		Flower												
39	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Sirkabad village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Aam	*Mangifera indica*	Fruit												
2	Amla	*Phyllanthus emblica*	Fruit												
3	Amlaki	*Emblica officinalis*	Fruit												
4	Bahera	*Terminalia bellerica*	Fruit												
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root												
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes												
7	Ban-pui	*Basella alba*	Leaf												
8	Bel	*Aegle marmelos*	Fruit												
9			Leaf												
10	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre												
11	Bhela	*Semecarpus anacardium*	Fruit												
12	Dhatki	*Woodfordia furticosa*	Flower												
13	Gethi-alu	*Dioscorea sp.*	Tuber root												
14	Haritaki	*Terminalia chebula*	Fruit												
15	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre												
16	Jam	*Syzyguim cumini*	Fruit												
17	Jihur	*Lanea grandis*	Flower												
18	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf												
19	Kend	*Diospyros melanoxylon*	Leaf												
20	Keoa	*Costus speciosus*	Flower												
21	Khair	*Acacia catechu*	Bark / Fibre												
22	Kul	*Zizyphus jujube*	Fruit												
23	Kulekhara	*Hygrophila auriculata*	Leaf												
24	Kurchi	*Holarrhena antidysenterica*	Seed												
25	Piyal	*Buchanania lanzan*	Fruit												
26			Leaf												
27	Ram basak	*Phlogacanthus thyrsiformis*	Fruit												
28	Sal	*Shorea robusta*	Branch												
29			Leaf												
30			Seed												
31	Satamuli	*Asparagus racemosus*	Root												
32	Sidha	*Lagerstoemia parviflora*	Fruit												
33	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Kalaboni village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Gethi-alu	*Dioscorea sp.*	Tuber root												
2	Sal	*Shorea robusta*	Leaf												
3	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Gurahata village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Aam	*Mangifera indica*	Fruit												
2	Amla	*Phyllanthus emblica*	Fruit												
3	Anantamul	*Hemidesmus indicus*	Root												
4	Bahera	*Terminalia bellerica*	Fruit												
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root												
6	Ban-khajur	*Phoenix acaulis*	Fruit												
7	Ban-pui	*Basella alba*	Leaf												
8	Bel	*Aegle marmelos*	Fruit												
9			Leaf												
10	Bhela	*Semecarpus anacardium*	Fruit												
11	Gethi-alu	*Dioscorea sp.*	Tuber root												
12	Ghang (Kihor)	*Phaneria vialii*	Fruit												
13			Leaf												
14	Haritaki	*Terminalia chebula*	Fruit												
15	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre												
16	Jam	*Syzyguim cumini*	Fruit												
17	Kalmegh	*Andrographis paniculata*	Leaf												
18	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf												
19	Kath pan	*Eresia lebis*	Bark / Fibre												
20	Kend	*Diospyros melanoxylon*	Fruit												
21			Leaf												
22	Khejur Jhuti	*Phoenix sp.*	Leaf												
23	Kukui-alu (Kurang/Kharia)	*Dioscorea sp.*	Tuber root												
24	Kul	*Zizyphus jujube*	Fruit												
25	Kurchi	*Holarrhena antidysenterica*	Fruit												
26	Piyal	*Buchanania lanzan*	Fruit												
27	Sal	*Shorea robusta*	Leaf												
28	Sushuni-alu (Tinputura-alu)	*Dioscorea esculenta*	Tuber root												
29	Satamuli	*Asparagus racemosus*	Root												
30	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Jamdaha village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Amlaki	*Emblica officinalis*	Fruit	■											■
2	Anantamul	*Hemidesmus indicus*	Root	■	■	■	■	■	■	■	■	■	■	■	■
3	Arjun	*Terminalia arjuna*	Bark / Fibre	■	■	■	■	■	■	■	■	■	■	■	■
4	Bahera	*Terminalia bellerica*	Fruit	■										■	■
5	Ban-Khajur	*Phoenix acaulis*	Fruit					■	■						
6			Leaf						■	■					
7	Ban-kundri	*Coccinia grandis*	Fruit						■	■					
8	Bangla-alu	*Dioscorea bulbifera*	Tuber root									■	■		
9	Ban-pui	*Basella alba*	Leaf					■	■	■					
10	Bhela	*Semecarpus anacardium*	Fruit			■	■								
11			Seed			■	■								
12	Bhencha		Fruit							■	■				
13	Bhurru	*Gardenia gummifera*	Fruit							■	■				
14	*Dhumpu*	*Sicus lacore*	Tuber root	■			■	■	■	■	■	■	■	■	■
15	Haritaki	*Terminalia chebula*	Fruit									■	■	■	■
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark							■	■				
17	Jam	*Syzyguim cumini*	Fruit					■	■						
18	Kalmegh	*Andrographis paniculata*	Leaf									■	■		
19	Kanchan (*Kural*)	*Bauhinia purpurea / Bauhinia acuminata*	Leaf					■	■						
20	Kend	*Diospyros melanoxylon*	Fruit					■	■	■					
21			Leaf			■	■	■							
22	Kurchi	*Holarrhena antidysenterica*	Bark										■	■	
23			Fruit		■	■									
24	Kusum	*Schleichera oleosa*	Seed				■	■							
25	Lodh	*Symplocos racemosa*	Bark / Fibre									■	■		
26	Mahua (*Mahul*)	*Madhuca indica*	Flower			■	■								
27			Fruit (*Kachra*)					■	■						
28	Mushroom	*Agaricus bisporus*	Plant							■	■	■	■	■	
29	Parashi	*Cleistanthus collinus*	Leaf	■	■			■	■	■	■	■	■	■	■
30	Pia-sal	*Pterocarpus marsupium*	Leaf	■	■			■	■	■	■	■	■	■	■
31	Piyal	*Buchanania lanzan*	Fruit			■	■								
32			Seed			■	■								
33	Sal	*Shorea robusta*	Flower			■	■								
34			Leaf	■			■	■	■	■	■	■	■	■	■
35			Seed				■	■							
36	Satamuli	*Asparagus racemosus*	Root	■	■	■	■	■	■	■	■	■	■	■	■
37	Firewood		Leaves / Branches	■	■	■	■	■	■	■	■	■	■	■	■

■ Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Barudi village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Ban-kundri	*Coccinia grandis*	Fruit												
2	Bat	*Ficus bengalensis*	Fruit												
3			Leaf												
4	Bel	*Aegle marmelos*	Fruit												
5			Leaf												
6	Bhencha		Fruit												
7	Bhurru	*Gardenia gummifera*	Fruit												
8	Dumur	*Ficus hispida*	Fruit												
9	Ghee karla	*Momordica dioica*	Fruit												
10	Kend	*Diospyros melanoxylon*	Fruit												
11			Leaf												
12	Mahua (*Mahul*)	*Madhuca indica*	Flower												
13			Fruit (*Kachra*)												
14	Mushroom	*Agaricus bisporus*	Plant												
15	Piyal	*Buchanania lanzan*	Fruit												
16	Sal	*Shorea robusta*	Leaf												
17	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Katiam village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Amla	*Phyllanthus emblica*	Fruit												
2	Anantamul	*Hemidesmus indicus*	Root												
3	Bahera	*Terminalia bellerica*	Fruit												
4	Ban-Khajur	*Phoenix acaulis*	Fruit												
5			Leaf												
6	Ban-kundri	*Coccinia grandis*	Fruit												
7	Ban-alu	*Dioscorea bulbifera*	Tuber root												
8	Ban-kumro	*Cucurbita sp.*	Fruit												
9	Ban-piyanj	*Allium sp.*	Stem												
10	Ban-rasun	*Allium ampeloprasum*	Stem												
11	Bel	*Aegle marmelos*	Fruit												
12	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre												
13			Fruit												
14	Bhela	*Semecarpus anacardium*	Fruit												
15			Seed												
16	Bhencha		Fruit												
17	Bhurru	*Gardenia gummifera*	Fruit												
18	Dhatki	*Woodfordia furticosa*	Flower												
19	Dumur	*Ficus hispida*	Fruit												
20	Ghee karla	*Momordica dioica*	Fruit												
21	Haritaki	*Terminalia chebula*	Fruit												
22	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark												
23	Iswarimul	*Aristolochia indica*	Root												
24	Jam	*Syzyguim cumini*	Fruit												
25	Jihur (Jirul)	*Lanea grandis*	Flower												
26	Kalmegh	*Andrographis paniculata*	Leaf												
27	Kend	*Diospyros melanoxylon*	Fruit												
28			Leaf												
29	Kurchi	*Holarrhena antidysenterica*	Fruit												
30	Lodh	*Symplocos racemosa*	Bark / Fibre												
31	Mushroom	*Agaricus bisporus*	Plant												
32	Nageswar	*Desmodium motorium*	Leaf												
33	Neel kantha	*Polygala crotalarioides*	Root												
34	Palash	*Butea monosperma*	Flower												
35	Piyal	*Buchanania lanzan*	Fruit												
36	Ramdatunermul	*Smilax ovalifolia*	Root												
37	Sal	*Shorea robusta*	Leaf												
38			Seed												
39	Satamuli	*Asparagus racemosus*	Root												
40	Simul	*Bombax malabaricum*	Flower												
41	Tilai		Flower												
42	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Dakshinsol village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Anantamul	*Hemidesmus indicus*	Root												
2	Bhela	*Semecarpus anacardium*	Fruit												
3	Iswarimul	*Aristolochia indica*	Root												
4	Kend	*Diospyros melanoxylon*	Leaf												
5	Kham-alu (Banola-alu)	*Dioscorea alata*	Rhizomes												
6	Mahua (*Mahul*)	*Madhuca indica*	Flower												
7			Fruit (*Kachra*)												
8			Seed												
9	Mushroom	*Agaricus bisporus*	Plant												
10	Neel kantha	*Polygala crotalarioides*	Root												
11	Sal	*Shorea robusta*	Leaf												
12			Seed												
13	Satamuli	*Asparagus racemosus*	Root												
14	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Harinaganj village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Anantamul	*Hemidesmus indicus*	Root												
2	Bahera	*Terminalia bellerica*	Fruit												
3	Bakhar	*Elephantopus scaber*	Whole plant & flower												
4	Bhela	*Semecarpus anacardium*	Fruit												
5	Kalmegh	*Andrographis paniculata*	Leaf												
6	Kham-alu (Bnaola)	*Dioscorea alata*	Rhizomes												
7	Kend	*Diospyros melanoxylon*	Fruit												
8			Leaf												
9	Mahua (*Mahul*)	*Madhuca indica*	Flower												
10			Fruit												
11	Mushroom	*Agaricus bisporus*	Plant												
12	Piyal	*Buchanania lanzan*	Fruit												
13	Sal	*Shorea robusta*	Gum												
14			Leaf												
15			Seed												
16	Satamuli	*Asparagus racemosus*	Root												
17	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Kendua village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Kend	*Diospyros melanoxylon*	Leaf												
2	Mahua (*Mahul*)	*Madhuca indica*	Flower												
3			Fruit												
4	Mushroom	*Agaricus bisporus*	Plant												
5	Sal	*Shorea robusta*	Gum												
6			Leaf												
7			Seed												
8	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

NTFPs collection calendar for Shushni village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collection period											
				Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	Anantamul	*Hemidesmus indicus*	Root												
2	Bhela	*Semecarpus anacardium*	Fruit												
3	Kend	*Diospyros melanoxylon*	Leaf												
4	Mahua (*Mahul*)	*Madhuca indica*	Flower												
5			Fruit												
6	Mushroom	*Agaricus bisporus*	Plant												
7	Piyal	*Buchanania lanzan*	Fruit												
8	Sal	*Shorea robusta*	Gum												
9			Leaf												
10			Seed												
11	Firewood		Leaves / Branches												

Collection period

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Bhuda village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	NTFPs collected by	Amount of product collected by each Hh/month	Total amount of collection in a year
1	Amlaki	*Emblica officinalis*	Fruit	Anybody	3kg	3kg
2			Leaf	Anybody	1kg	1kg
3	Anantamul	*Hemidesmus indicus*	Root	Male	1kg	1kg
4	Bahera	*Terminalia bellerica*	Fruit	Anybody	1kg	1kg
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Male	20kg	40kg
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes	Male	5kg	5kg
7	Ban-pui	*Basella alba*	Leaf	Anybody	4kg	4kg
8	Bel	*Aegle marmelos*	Fruit	Anybody	75kg	75kg
9			Leaf	Male	2kg	2kg
10	Bhela	*Semecarpus anacardium*	Fruit	Anybody	3kg	3kg
11	Dangua pan	*Smilex macrophyla*	Bark	Male	80kg	80kg
12	Dhatki	*Woodfordia furticosa*	Flower	Anybody	1kg	1kg
13	Gethi-alu	*Dioscorea sp.*	Tuber root	Male	40kg	80kg
14	Ghentu	*Typhonium trilobetum*	Flower	Anybody	1kg	1kg
15	Haritaki	*Terminalia chebula*	Fruit	Anybody	1kg	1kg
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	Male	30kg	30kg
17	Jam	*Syzyguim cumini*	Fruit	Anybody	10kg	10kg
18	Kachu saag	*Colocasia esculenta*	Leaf	Male / Female	8kg	8kg
19	Kalmegh	*Andrographis paniculata*	Leaf	Anybody	4kg	4kg
20	Kanakendi (Arjun)	*Terminalia arjuna*	Bark	Anybody	1kg	1kg
21	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Male / Female	8 kg	8kg
22	Kend	*Diospyros melanoxylon*	Fruit	Anybody	1kg	1kg
23			Leaf	Male / Female	1 *Chata* (5kg) *	2 *Chata*
24	Khar grass	*Cucumis sativus*	Leaf	Anybody		
25	Kukui-alu	*Dioscorea sp.*	Tuber	Male	20kg	40kg
26	Kul	*Zizyphus jujube*	Fruit	Anybody	5kg	5kg
27	Mahua (*Mahul*)	*Madhuca indica*	Flower	Anybody	10kg	10kg
28	Mushroom	*Agaricus bisporus*	Plant	Anybody	5kg	15kg
29	Paina lata	*Bauhinia volubilis*	Leaf	Anybody	5kg	5kg
30	Panja-alu	*Dioscorea sp.*	Tuber	Male	15kg	30kg
31	Piyal	*Buchanania lanzan*	Fruit	Anybody	1kg	1kg
32	Sal	*Shorea robusta*	Leaf	Anybody	3000 plates	27,000 plates
33			Flower	Anybody	1kg	1kg
34			Gum	Anybody	250gm	1kg
35	Sushuni-alu	*Dioscorea esculenta*	Tuber root	Male	15kg	30kg
36	Telhe	*Sterculia urens*	Bark	Anybody	1kg	1kg
37	Thara-alu	*Dioscorea sp.*	Tuber root	Male	20kg	40kg
38	Tilai		Flower	Anybody	1kg	1kg
39	Firewood		Leaves / Branches	Male / Female	300kg	3600kg

(*Each *Chata* contains 2000 leaves, which weights 3kg)

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Sirkabad village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each household / month	Total amount of collection in a year
1	Aam	*Mangifera indica*	Fruit	Anybody	15kg	15kg
2	Amla	*Phyllanthus emblica*	Fruit	Anybody	30kg	30kg
3	Amlaki	*Emblica officinalis*	Fruit	Anybody	5kg	5kg
4	Bahera	*Terminalia bellerica*	Fruit	Anybody	20kg	20kg
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Male	10kg	20kg
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes	Male	5kg	5kg
7	Ban-pui	*Basella alba*	Leaf	Anybody	8kg	16kg
8	Bel	*Aegle marmelos*	Fruit	Anybody	20kg	40kg
9			Leaf	Male	2kg	5kg
10	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre	Male	12kg	12kg
11	Bhela	*Semecarpus anacardium*	Fruit	Anybody	4kg	4kg
12	Dhatki	*Woodfordia furticosa*	Flower	Anybody	1kg	1kg
13	Gethi-alu	*Dioscorea sp.*	Tuber root	Male	30kg	30kg
14	Haritaki	*Terminalia chebula*	Fruit	Anybody	25kg	50kg
15	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre	Male / Female	5kg	5kg
16	Jam	*Syzyguim cumini*	Fruit	Anybody	10kg	10kg
17	Jihur	*Lanea grandis*	Flower	Anybody	1kg	1kg
18	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Male / Female	10kg	10kg
19	Kend	*Diospyros melanoxylon*	Leaf	Male / Female	12 *Chata**	25 *Chata*
20	Keoa	*Costus speciosus*	Flower	Anybody	1kg	1kg
21	Khair	*Acacia catechu*	Bark / Fibre	Male / Female	20kg	20kg
22	Kul	*Zizyphus jujube*	Fruit	Anybody	25kg	25kg
23	Kulekhara	*Hygrophila auriculata*	Leaf	Anybody	2kg	2kg
24	Kurchi	*Holarrhena antidysenterica*	Seed	Anybody	10kg	20kg
25	Piyal	*Buchanania lanzan*	Fruit	Anybody	1kg	1kg
26			Leaf	Male / Female	4kg	4kg
27	Ram basak	*Phlogacanthus thyrsiformis*	Fruit	Anybody	1kg	1kg
28	Sal	*Shorea robusta*	Branch	Anybody	3000 plates	24000
29			Leaf	Anybody	4 bundle	48 bundle
30			Seed	Anybody	75kg	75kg
31	Satamuli	*Asparagus racemosus*	Root	Anybody	1kg	1kg
32	Sidha	*Lagerstoemia parviflora*	Fruit	Anybody	5kg	5kg
33	Firewood		Leaves / Branches	Male / Female	300kg	3000kg

(*Each *Chata* contains 2000 leaves, which weights 3kg)

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Kalaboni village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each household / month	Total amount of collection in a year
1	Gethi-alu	*Dioscorea sp.*	Tuber root	Male	20kg	40kg
2	Sal	*Shorea robusta*	Leaf	Anybody	3000 plates	24000
3	Firewood		Leaves / Branches	Male / Female	750kg	6750kg

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Gurahata village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each household / month	Total amount of collection in a year
1	Aam	*Mangifera indica*	Fruit	Anybody	20kg	20kg
2	Amla	*Phyllanthus emblica*	Fruit	Anybody	25kg	25kg
3	Anantamul	*Hemidesmus indicus*	Root	Male	1kg	1kg
4	Bahera	*Terminalia bellerica*	Fruit	Anybody	20kg	20kg
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Male	5kg	5kg
6	Ban-khajur	*Phoenix acaulis*	Fruit	Anybody	5kg	5kg
7	Ban-pui	*Basella alba*	Leaf	Anybody	2kg	4kg
8	Bel	*Aegle marmelos*	Fruit	Anybody	20kg	20kg
9			Leaf	Male		
10	Bhela	*Semecarpus anacardium*	Fruit	Anybody	1kg	1kg
11	Gethi-alu	*Dioscorea sp.*	Tuber root	Male	40kg	40kg
12	Ghang (Kihor)	*Phaneria vialii*	Fruit	Male / Female	5 piece	5 piece
13			Leaf	Anybody	5kg	5kg
14	Haritaki	*Terminalia chebula*	Fruit	Anybody	60kg	60kg
15	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre	Male	20kg	20kg
16	Jam	*Syzyguim cumini*	Fruit	Anybody	10kg	10kg
17	Kalmegh	*Andrographis paniculata*	Leaf	Anybody	1kg	1kg
18	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Male / Female	2kg	4kg
19	Kath pan	*Eresia lebis*	Bark / Fibre	Anybody	20kg	20kg
20	Kend	*Diospyros melanoxylon*	Fruit	Anybody	25kg	25kg
21			Leaf	Male / Female	15 *Chata**	30 *Chata*
22	Khejur Jhuti	*Phoenix sp.*	Leaf	Male / Female	2kg	4kg
23	Kukui-alu (Kurang/Kharia)	*Dioscorea sp.*	Tuber root	Male	5kg	5kg
24	Kul	*Zizyphus jujube*	Fruit	Anybody	10kg	10kg
25	Kurchi	*Holarrhena antidysenterica*	Fruit	Anybody	60kg	60kg
26	Piyal	*Buchanania lanzan*	Fruit	Anybody	4kg	4kg
27	Sal	*Shorea robusta*	Leaf	Anybody	3000 plates	27000
28	Sushuni-alu (Tinputura-alu)	*Dioscorea esculenta*	Tuber root	Male	4kg	4kg
29	Satamuli	*Asparagus racemosus*	Root	Anybody	1kg	1kg
30	Firewood		Leaves / Branches	Male / Female	180kg	2100kg

(*Each *Chata* contains 2000 leaves, which weights 3kg) Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Jamdaha village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each Hh/month	Total amount of collection in a year
1	Amlaki	*Emblica officinalis*	Fruit	Anybody	1kg	2kg
2	Anantamul	*Hemidesmus indicus*	Root	Male	1kg	1kg
3	Arjun	*Terminalia arjuna*	Bark / Fibre	Male / Female	40kg	40kg
4	Bahera	*Terminalia bellerica*	Fruit	Male / Female	5kg	5kg
5	Ban-Khajur	*Phoenix acaulis*	Fruit	Male	1kg	1kg
6			Leaf	Male / Female		
7	Ban-kundri	*Coccinia grandis*	Fruit	Male / Female	2kg	2kg
8	Bangla-alu	*Dioscorea bulbifera*	Tuber root	Male	15kg	15kg
9	Ban-pui	*Basella alba*	Leaf	Anybody	1kg	2kg
10	Bhela	*Semecarpus anacardium*	Fruit	Anybody	5kg	5kg
11			Seed	Male / Female	3kg	3kg
12	Bhencha		Fruit	Anybody	4kg	4kg
13	Bhurru	*Gardenia gummifera*	Fruit	Anybody	16kg	16kg
14	*Dhumpu*	*Sicus lacore*	Tuber root	Male	1kg	1kg
15	Haritaki	*Terminalia chebula*	Fruit	Anybody	4kg	4kg
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	Male	2kg	2kg
17	Jam	*Syzyguim cumini*	Fruit	Anybody	40kg	40kg
18	Kalmegh	*Andrographis paniculata*	Leaf	Anybody	10kg	10kg
19	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Male / Female	1kg	2kg
20	Kend	*Diospyros melanoxylon*	Fruit	Anybody	40kg	80kg
21			Leaf	Anybody	15 *Chata**	45 *Chata*
22	Kurchi	*Holarrhena antidysenterica*	Bark	Male / Female	30kg	30kg
23			Fruit	Male / Female	40kg	40kg
24	Kusum	*Schleichera oleosa*	Seed	Anybody	4kg	8kg
25	Lodh	*Symplocos racemosa*	Bark / Fibre	Male / Female	12kg	12kg
26	Mahua (*Mahul*)	*Madhuca indica*	Flower	Female / Children	20kg	40kg
27			Fruit (*Kachra*)	Anybody	8kg	8kg
28	Mushroom	*Agaricus bisporus*	Plant	Anybody	10kg	30kg
29	Parashi	*Cleistanthus collinus*	Leaf	Anybody		
30	Pia-sal	*Pterocarpus marsupium*	Leaf	Anybody		
31	Piyal	*Buchanania lanzan*	Fruit	Male / Female	8kg	8kg
32			Seed	Anybody	5kg	5kg
33	Sal	*Shorea robusta*	Flower	Female / Children	500gm	500gm
34			Leaf	Anybody	10,000 plates	80,000 plates
35			Seed	Anybody	40kg	40kg
36	Satamuli	*Asparagus racemosus*	Root	Male / Female	1kg	1kg
37	Firewood		Leaves / Branches	Male / Female	400kg	3600kg

(*Each *Chata* contains 2000 leaves, which weights 3kg)

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Barudi village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each household / month	Total amount of collection in a year
1	Ban-kundri	*Coccinia grandis*	Fruit	Anybody	2kg	2kg
2	Bat	*Ficus bengalensis*	Fruit	Male	2kg	2kg
3			Leaf	Male		
4	Bel	*Aegle marmelos*	Fruit	Anybody	15kg	15kg
5			Leaf	Male		
6	Bhencha		Fruit	Anybody	2kg	2kg
7	Bhurru	*Gardenia gummifera*	Fruit	Male / Female	5kg	5kg
8	Dumur	*Ficus hispida*	Fruit	Male / Female	4kg	4kg
9	Ghee karla	*Momordica dioica*	Fruit	Male / Female	1kg	2kg
10	Kend	*Diospyros melanoxylon*	Fruit	Anybody	8kg	8kg
11			Leaf	Female / Children	8 *Chata**	24 *Chata*
12	Mahua (*Mahul*)	*Madhuca indica*	Flower	Anybody	60kg	60kg
13			Fruit (*Kachra*)	Anybody	10kg	10kg
14	Mushroom	*Agaricus bisporus*	Plant	Male / Female	5kg	10kg
15	Piyal	*Buchanania lanzan*	Fruit	Male	3kg	3kg
16	Sal	*Shorea robusta*	Leaf	Female / Children	3000 plates	24000
17	Firewood		Leaves / Branches	Male / Female	240kg	2500kg

(*Each *Chata* contains 2000 leaves, which weights 3kg) Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Katiam village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each household / month	Total amount of collection in a year
1	Amla	*Phyllanthus emblica*	Fruit	Male / Female	16kg	16kg
2	Anantamul	*Hemidesmus indicus*	Root	Male	4kg	10kg
3	Bahera	*Terminalia bellerica*	Fruit	Anybody	65kg	65kg
4	Ban-Khajur	*Phoenix acaulis*	Fruit	Anybody	2.5kg	2.5kg
5			Leaf	Male / Female		
6	Ban-kundri	*Coccinia grandis*	Fruit	Anybody	4kg	4kg
7	Ban-alu	*Dioscorea bulbifera*	Tuber root	Male / Female	25kg	25kg
8	Ban-kumro		Fruit	Male	5kg	5kg
9	Ban-piyanj	*Allium sp.*	Stem	Anybody	3kg	3kg
10	Ban-rasun	*Allium ampeloprasum*	Stem	Anybody	3kg	3kg
11	Bel	*Aegle marmelos*	Fruit	Anybody	60kg	60kg
12	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre	Male	15kg	15kg
13			Fruit	Anybody	5kg	5kg
14	Bhela	*Semecarpus anacardium*	Fruit	Anybody	4kg	4kg
15			Seed	Male / Female	1kg	1kg
16	Bhencha		Fruit	Anybody	8kg	8kg
17	Bhurru	*Gardenia gummifera*	Fruit	Anybody	25kg	25kg
18	Dhatki	*Woodfordia furticosa*	Flower	Anybody	20kg	20kg
19	Dumur	*Ficus hispida*	Fruit	Male	10kg	10kg
20	Ghee karla	*Momordica dioica*	Fruit	Male / Female	5kg	5kg
21	Haritaki	*Terminalia chebula*	Fruit	Anybody	30kg	60kg
22	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	Male / Female	35kg	35kg
23	Iswarimul	*Aristolochia indica*	Root	Male	5kg	10kg
24	Jam	*Syzyguim cumini*	Fruit	Anybody	20kg	20kg
25	Jihur (Jirul)	*Lanea grandis*	Flower	Anybody	4kg	4kg
26	Kalmegh	*Andrographis paniculata*	Leaf	Anybody	80kg	160kg
27	Kend	*Diospyros melanoxylon*	Fruit	Anybody	50kg	50kg
28			Leaf	Male / Female	20 *Chata**	40 *Chata*
29	Kurchi	*Holarrhena antidysenterica*	Fruit	Anybody	25kg	25kg
30	Lodh	*Symplocos racemosa*	Bark / Fibre	Male / Female	60kg	60kg
31	Mushroom	*Agaricus bisporus*	Plant	Anybody	15kg	30kg
32	Nageswar	*Desmodium motorium*	Leaf	Anybody	1kg	1kg
33	Neel kantha	*Polygala crotalarioides*	Root	Anybody	2.5kg	2.5kg
34	Palash	*Butea monosperma*	Flower	Anybody	60kg	60kg
35	Piyal	*Buchanania lanzan*	Fruit	Male / Female	8kg	8kg
36	Ramdatunermul	*Smilax ovalifolia*	Root	Male / Female	10kg	10kg
37	Sal	*Shorea robusta*	Leaf	Anybody	8000	64,000 plates
38			Seed	Anybody	150kg	150kg
39	Satamuli	*Asparagus racemosus*	Root	Male	8kg	8kg
40	Simul	*Bombax malabaricum*	Flower	Anybody	35kg	35kg
41	Tilai		Flower	Anybody	1kg	1kg
42	Firewood		Leaves / Branches	Male / Female	150kg	1800kg

(*Each *Chata* contains 2000 leaves, which weights 3kg)

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Dakshinsol village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each Hh/month	Total amount of collection in a year
1	Anantamul	*Hemidesmus indicus*	Root	Male	1kg	1kg
2	Bhela	*Semecarpus anacardium*	Fruit	Anybody	1kg	1kg
3	Iswarimul	*Aristolochia indica*	Root	Male	1kg	1kg
4	Kend	*Diospyros melanoxylon*	Leaf	Male / Female	20 *Chata* *	40 *Chata*
5	Kham-alu (Banola-alu)	*Dioscorea alata*	Rhizomes	Male	2kg	2kg
6	Mahua (*Mahul*)	*Madhuca indica*	Flower	Anybody	30kg	30kg
7			Fruit (*Kachra*)	Anybody	10kg	10kg
8			Seed	Anybody	6kg	6kg
9	Mushroom	*Agaricus bisporus*	Plant	Anybody	50kg	150kg
10	Neel kantha	*Polygala crotalarioides*	Root	Male	1kg	1kg
11	Sal	*Shorea robusta*	Leaf	Anybody	21,000 plates	168,000 plates
12			Seed	Female / Children	75kg	150kg
13	Satamuli	*Asparagus racemosus*	Root	Male	1kg	1kg
14	Firewood		Leaves / Branches	Male / Female	240kg	2880kg

(*Each *Chata* contains 2500 leaves)

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Harinaganj village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each Hh/month	Total amount of collection in a year
1	Anantamul	*Hemidesmus indicus*	Root	Male	1kg	1kg
2	Bahera	*Terminalia bellerica*	Fruit	Anybody	30kg	30kg
3	Bakhar	*Elephantopus scaber*	Whole plant & flower	Male / Female	20kg	20kg
4	Bhela	*Semecarpus anacardium*	Fruit	Anybody	500gm	1kg
5	Kalmegh	*Andrographis paniculata*	Leaf	Anybody	1kg	1kg
6	Kham-alu (Bnaola)	*Dioscorea alata*	Rhizomes	Male	1.5kg	1.5kg
7	Kend	*Diospyros melanoxylon*	Fruit	Anybody	1kg	1kg
8			Leaf	Male / Female	15 *Chata* *	30 *Chata*
9	Mahua (*Mahul*)	*Madhuca indica*	Flower	Anybody	20kg	40kg
10			Fruit	Anybody	10kg	10kg
11	Mushroom	*Agaricus bisporus*	Plant	Male / Female	30kg	90kg
12	Piyal	*Buchanania lanzan*	Fruit	Anybody	1kg	1kg
13	Sal	*Shorea robusta*	Gum	Anybody	15,000 plates	135,000 plates
14			Leaf	Female / Children	100kg	200kg
15			Seed	Male / Female	250gm	3kg
16	Satamuli	*Asparagus racemosus*	Root	Male	1kg	1kg
17	Firewood		Leaves / Branches	Male / Female	300kg	3000kg

(*Each *Chata* contains 2500 leaves)

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Kendua village, Jamboni Range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each Hh/month	Total amount of collection in a year
1	Kend	*Diospyros melanoxylon*	Leaf	Anybody	3 *Chata* *	10 *Chata*
2	Mahua (*Mahul*)	*Madhuca indica*	Flower	Anybody	60kg	60kg
3			Fruit	Anybody	10kg	10kg
4	Mushroom	*Agaricus bisporus*	Plant	Anybody	30kg	90kg
5	Sal	*Shorea robusta*	Gum	Anybody	30,000 plates	210,000 plates
6			Leaf	Female / Children	300kg	300kg
7			Seed	Male / Female	250gm	1kg
8	Firewood		Leaves / Branches	Male / Female	150kg	1500kg

(*Each *Chata* contains 2500 leaves)

Data source: Based on questionnaire survey

Monthly & annual collection of NTFPs collected by different family members at Shushni village, Jamboni Range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Collected by	Amount of product collected by each Hh/month	Total amount of collection in a year
1	Anantamul	*Hemidesmus indicus*	Root	Male	500gm	500gm
2	Bhela	*Semecarpus anacardium*	Fruit	Anybody	500gm	500gm
3	Kend	*Diospyros melanoxylon*	Leaf	Male / Female	15 *Chata* *	30 *Chata*
4	Mahua (*Mahul*)	*Madhuca indica*	Flower	Anybody	50kg	50kg
5			Fruit	Anybody	15kg	15kg
6	Mushroom	*Agaricus bisporus*	Plant	Male / Female	30kg	50kg
7	Piyal	*Buchanania lanzan*	Fruit	Anybody	15kg	15kg
8	Sal	*Shorea robusta*	Gum	Anybody	15,000 plates	120,000 plates
9			Leaf	Female / Children	75kg	150kg
10			Seed	Male / Female	250gm	500gm
11	Firewood		Leaves / Branches	Male / Female	200kg	2400kg

(*Each *Chata* contains 2500 leaves)

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Bhuda village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Amlaki	*Emblica officinalis*	Fruit	Medicinal	Domestic
2			Leaf	Fodder / Worship	Domestic
3	Anantamul	*Hemidesmus indicus*	Root	Medicinal	Domestic
4	Bahera	*Terminalia bellerica*	Fruit	Medicinal	Domestic
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Vegetable	Domestic
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes	Vegetable	Domestic
7	Ban-pui	*Basella alba*	Leaf	Vegetable	Domestic
8	Bel	*Aegle marmelos*	Fruit	Fruit	Both
9			Leaf	Worship	Domestic
10	Bhela	*Semecarpus anacardium*	Fruit	Fruit	Domestic
11	Dangua pan	*Smilex macrophyla*	Bark	Raw material for incense stick	Commercial
12	Dhatki	*Woodfordia furticosa*	Flower	Worship	Domestic
13	Gethi-alu	*Dioscorea sp.*	Tuber root	Vegetable	Domestic
14	Ghentu	*Typhonium trilobetum*	Flower	Worship	Domestic
15	Haritaki	*Terminalia chebula*	Fruit	Medicinal	Domestic
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	Raw material for incense stick	Commercial
17	Jam	*Syzyguim cumini*	Fruit	Fruit	Both
18	Kachu saag	*Colocasia esculenta*	Leaf	Vegetable	Domestic
19	Kalmegh	*Andrographis paniculata*	Leaf	Medicinal	Domestic
20	Kanakendi (Arjun)	*Terminalia arjuna*	Bark	Medicinal	Domestic
21	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Vegetable	Domestic
22	Kend	*Diospyros melanoxylon*	Fruit	Fruit	Domestic
23			Leaf	*Bidi* making	Domestic
24	Khar grass	*Cucumis sativus*	Leaf	Thatch making	Domestic
25	Kukui-alu	*Dioscorea sp.*	Tuber	Vegetable	Domestic
26	Kul	*Zizyphus jujube*	Fruit	Fruit	Domestic
27	Mahua (*Mahul*)	*Madhuca indica*	Flower	Liquor / Vegetable	Domestic
28	Mushroom	*Agaricus bisporus*	Plant	Vegetable	Domestic
29	Paina lata	*Bauhinia volubilis*	Leaf	Gum	Domestic
30	Panja-alu	*Dioscorea sp.*	Tuber	Vegetable	Domestic
31	Piyal	*Buchanania lanzan*	Fruit	Fruit	Domestic
32	Sal	*Shorea robusta*	Leaf	Plate making	Commercial
33			Flower	Worship	Domestic
34			Gum	Miscellaneous	Domestic
35	Sushuni-alu	*Dioscorea esculenta*	Tuber root	Vegetable	Domestic
36	Telhe	*Sterculia urens*	Bark	Medicinal	Domestic
37	Thara-alu	*Dioscorea sp.*	Tuber root	Vegetable	Domestic
38	Tilai		Flower	Worship	Domestic
39	Firewood		Leaves / Branches	Fuel	Domestic

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Sirkabad village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Aam	*Mangifera indica*	Fruit	Fruit	Both
2	Amla	*Phyllanthus emblica*	Fruit	Medicinal / Hair dye	Both
3	Amlaki	*Emblica officinalis*	Fruit	Medicinal	Both
4	Bahera	*Terminalia bellerica*	Fruit	Medicinal	Both
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Vegetable	Domestic
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes	Vegetable	Both
7	Ban-pui	*Basella alba*	Leaf	Vegetable	Both
8	Bel	*Aegle marmelos*	Fruit	Fruit	Both
9			Leaf	Worship	Domestic
10	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre	Medicinal	Both
11	Bhela	*Semecarpus anacardium*	Fruit	Fruit	Both
12	Dhatki	*Woodfordia furticosa*	Flower	Worship	Domestic
13	Gethi-alu	*Dioscorea sp.*	Tuber root	Vegetable	Domestic
14	Haritaki	*Terminalia chebula*	Fruit	Medicinal	Both
15	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre	Raw material for incense stick	Commercial
16	Jam	*Syzyguim cumini*	Fruit	Fruit	Both
17	Jihur	*Lanea grandis*	Flower	Worship	Domestic
18	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Vegetable	Both
19	Kend	*Diospyros melanoxylon*	Leaf	*Bidi* making	Both
20	Keoa	*Costus speciosus*	Flower	Medicinal / Worship	Domestic
21	Khair	*Acacia catechu*	Bark / Fibre	Medicinal	Commercial
22	Kul	*Zizyphus jujube*	Fruit	Fruit	Both
23	Kulekhara	*Hygrophila auriculata*	Leaf	Medicinal	Domestic
24	Kurchi	*Holarrhena antidysenterica*	Seed	Medicinal	Both
25	Piyal	*Buchanania lanzan*	Fruit	Fruit	Domestic
26			Leaf	Vegetable	Domestic
27	Ram basak	*Phlogacanthus thyrsiformis*	Fruit	Medicinal	Domestic
28	Sal	*Shorea robusta*	Branch	Plate making	Commercial
29			Leaf	Toothbrush	Both
30			Seed	Industrial raw material	Commercial
31	Satamuli	*Asparagus racemosus*	Root	Medicinal	Domestic
32	Sidha	*Lagerstoemia parviflora*	Fruit	Fruit	Commercial
33	Firewood		Leaves / Branches	Fuel	Both

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Kalaboni village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Gethi-alu	*Dioscorea sp.*	Tuber root	Vegetable	Domestic
2	Sal	*Shorea robusta*	Leaf	Plate makin	Commercial
3	Firewood		Leaves / Branches	Fuel	Both

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Gurahata village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Aam	*Mangifera indica*	Fruit	Fruit	Both
2	Amla	*Phyllanthus emblica*	Fruit	Medicinal / Hair dye	Both
3	Anantamul	*Hemidesmus indicus*	Root	Medicinal	Domestic
4	Bahera	*Terminalia bellerica*	Fruit	Medicinal	Commercial
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Vegetable	Domestic
6	Ban-khajur	*Phoenix acaulis*	Fruit	Fruit	Both
7	Ban-pui	*Basella alba*	Leaf	Vegetable	Domestic
8	Bel	*Aegle marmelos*	Fruit	Fruit	Both
9	Bhela	*Semecarpus anacardium*	Fruit	Fruit / For oil producing	Domestic
10	Gethi-alu	*Dioscorea sp.*	Tuber root	Vegetable	Domestic
11	Ghang (Kihor)	*Phaneria vialii*	Fruit	For making umbrella	Domestic
12			Leaf	For labelling wall	Domestic
13	Haritaki	*Terminalia chebula*	Fruit	Medicinal	Both
14	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre	Raw material for incense stick	Commercial
15	Jam	*Syzyguim cumini*	Fruit	Fruit	Both
16	Kalmegh	*Andrographis paniculata*	Leaf	Medicinal	Both
17	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Vegetable	Domestic
18	Kath pan	*Eresia lebis*	Bark / Fibre	Medicinal	Both
19	Kend	*Diospyros melanoxylon*	Fruit	Fruit	Both
20			Leaf	*Bidi* making	Both
21	Khejur Jhuti	*Phoenix sp.*	Leaf	Vegetable	Domestic
22	Kukui-alu (Kurang/Kharia)	*Dioscorea sp.*	Tuber root	Vegetable	Domestic
23	Kul	*Zizyphus jujube*	Fruit	Fruit	Both
24	Kurchi	*Holarrhena antidysenterica*	Fruit	Medicinal	Commercial
25	Piyal	*Buchanania lanzan*	Fruit	Fruit	Domestic
26	Sal	*Shorea robusta*	Leaf	Plate making	Commercial
27	Sushuni-alu (Tinputura-alu)	*Dioscorea esculenta*	Tuber root	Vegetable	Domestic
28	Satamuli	*Asparagus racemosus*	Root	Medicinal	Domestic
29	Firewood		Leaves / Branches	Fuel	Both

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Jamdaha village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Amlaki	*Emblica officinalis*	Fruit	Medicinal	Both
2	Anantamul	*Hemidesmus indicus*	Root	Medicinal	Both
3	Arjun	*Terminalia arjuna*	Bark / Fibre	Medicinal	Commercial
4	Bahera	*Terminalia bellerica*	Fruit	Medicinal	Commercial
5	Ban-Khajur	*Phoenix acaulis*	Fruit	Fruit	Domestic
6			Leaf	Mat	Domestic
7	Ban-kundri	*Coccinia grandis*	Fruit	Vegetable	Both
8	Bangla-alu	*Dioscorea bulbifera*	Tuber root	Vegetable	Domestic
9	Ban-pui	*Basella alba*	Leaf	Vegetable	Domestic
10	Bhela	*Semecarpus anacardium*	Fruit	Fruit	Domestic
11			Seed	Oil producing (lubricating oil)	Domestic
12	Bhencha		Fruit	Fruit	Both
13	Bhurru	*Gardenia gummifera*	Fruit	Fruit	Both
14	*Dhumpu*	*Sicus lacore*	Tuber root	Medicinal / Liquor	Both
15	Haritaki	*Terminalia chebula*	Fruit	Medicinal	Commercial
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	Medicinal / Raw material for incense stick	Both
17	Jam	*Syzyguim cumini*	Fruit	Fruit	Both
18	Kalmegh	*Andrographis paniculata*	Leaf	Medicinal	Both
19	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Vegetable	Domestic
20	Kend	*Diospyros melanoxylon*	Fruit	Fruit	Both
21			Leaf	*Bidi* making	Commercial
22	Kurchi	*Holarrhena antidysenterica*	Bark	Fruit	Both
23			Fruit	Medicinal	Commercial
24	Kusum	*Schleichera oleosa*	Seed	Food / Oil producing	Both
25	Lodh	*Symplocos racemosa*	Bark / Fibre	Medicinal	Commercial
26	Mahua (*Mahul*)	*Madhuca indica*	Flower	Liquor / Vegetable / Worship	Both
27			Fruit (*Kachra*)	Fruit / Oil producing	Both
28	Mushroom	*Agaricus bisporus*	Plant	Vegetable	Both
29	Parashi	*Cleistanthus collinus*	Leaf	Fodder	Domestic
30	Pia-sal	*Pterocarpus marsupium*	Leaf	Fodder	Domestic
31	Piyal	*Buchanania lanzan*	Fruit	Fruit	Both
32			Seed	Oil producing	Both
33	Sal	*Shorea robusta*	Flower	Worship	Domestic
34			Leaf	Plate making / *Chuti* (Cigarette)	Both
35			Seed	Industrial raw material	Commercial
36	Satamuli	*Asparagus racemosus*	Root	Medicinal	Both
37	Firewood		Leaves / Branches	Fuel	Both

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Barudi village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Ban-kundri	*Coccinia grandis*	Fruit	vegetable / Medicinal	Both
2	Bat	*Ficus bengalensis*	Fruit	Fruit	Domestic
3			Leaf	Fodder	Domestic
4	Bel	*Aegle marmelos*	Fruit	Fruit	Domestic
5			Leaf	Worship	Domestic
6	Bhencha		Fruit	Fruit	Domestic
7	Bhurru	*Gardenia gummifera*	Fruit	Vegetable / Fruit	Both
8	Dumur	*Ficus hispida*	Fruit	Vegetable / Fruit	Domestic
9	Ghee karla	*Momordica dioica*	Fruit	Vegetable	Domestic
10	Kend	*Diospyros melanoxylon*	Fruit	Fruit	Both
11			Leaf	*Bidi* making	Both
12	Mahua (*Mahul*)	*Madhuca indica*	Flower	Liquor / Vegetable	Both
13			Fruit (*Kachra*)	Fruit / Oil producing / Vegetable	Both
14	Mushroom	*Agaricus bisporus*	Plant	Vegetable	Both
15	Piyal	*Buchanania lanzan*	Fruit	Fruit	Both
16	Sal	*Shorea robusta*	Leaf	Plate making	Commercial
17	Firewood		Leaves / Branches	Fuel	Both

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Katiam village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Amla	*Phyllanthus emblica*	Fruit	Medicinal / Hair dye	Both
2	Anantamul	*Hemidesmus indicus*	Root	Medicinal	Commercial
3	Bahera	*Terminalia bellerica*	Fruit	Medicinal	Commercial
4	Ban-Khajur	*Phoenix acaulis*	Fruit	Fruit	Both
5			Leaf	Mat making	Both
6	Ban-kundri	*Coccinia grandis*	Fruit	Vegetable	Both
7	Ban-alu	*Dioscorea bulbifera*	Tuber root	Vegetable	Both
8	Ban-kumro		Fruit	Vegetable	Both
9	Ban-piyanj	*Allium sp.*	Stem	Vegetable	Commercial
10	Ban-rasun	*Allium ampeloprasum*	Stem	Vegetable	Both
11	Bel	*Aegle marmelos*	Fruit	Fruit	Both
12	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre	Medicinal	Commercial
13			Fruit	Medicinal	Commercial
14	Bhela	*Semecarpus anacardium*	Fruit	Fruit	Domestic
15			Seed	Medicinal	Commercial
16	Bhencha		Fruit	Fruit	Both
17	Bhurru	*Gardenia gummifera*	Fruit	Fruit	Both
18	Dhatki	*Woodfordia furticosa*	Flower	Medicinal / Worship	Both
19	Dumur	*Ficus hispida*	Fruit	Vegetable	Both
20	Ghee karla	*Momordica dioica*	Fruit	Vegetable	Both
21	Haritaki	*Terminalia chebula*	Fruit	Medicinal	Both
22	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	Medicinal	Both
23	Iswarimul	*Aristolochia indica*	Root	Medicinal	Commercial
24	Jam	*Syzyguim cumini*	Fruit	Fruit	Both
25	Jihur (Jirul)	*Lanea grandis*	Flower	Vegetable	Both
26	Kalmegh	*Andrographis paniculata*	Leaf	Medicinal	Both
27	Kend	*Diospyros melanoxylon*	Fruit	Fruit	Both
28			Leaf	*Bidi* making	Both
29	Kurchi	*Holarrhena antidysenterica*	Fruit	Medicinal	Commercial
30	Lodh	*Symplocos racemosa*	Bark / Fibre	Medicinal	Both
31	Mushroom	*Agaricus bisporus*	Plant	Vegetable	Both
32	Nageswar	*Desmodium motorium*	Leaf	Medicinal	Commercial
33	Neel kantha	*Polygala crotalarioides*	Root	Medicinal	Both
34	Palash	*Butea monosperma*	Flower	Worship / Dye / Medicinal	Both
35	Piyal	*Buchanania lanzan*	Fruit	Fruit	Both
36	Ramdatunermul	*Smilax ovalifolia*	Root	Medicinal	Commercial
37	Sal	*Shorea robusta*	Leaf	Plate making / Worship	Both
38			Seed	Industrial raw material	Commercial
39	Satamuli	*Asparagus racemosus*	Root	Medicinal	Commercial
40	Simul	*Bombax malabaricum*	Flower	Medicinal / Industrial raw material	Commercial
41	Tilai		Flower	Worship	Both
42	Firewood		Leaves / Branches	Fuel	Both

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Dakshinsol village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Anantamul	*Hemidesmus indicus*	Root	Medicinal	Domestic
2	Bhela	*Semecarpus anacardium*	Fruit	Fruit / Medicinal	Domestic
3	Iswarimul	*Aristolochia indica*	Root	Medicine	Domestic
4	Kend	*Diospyros melanoxylon*	Leaf	*Bidi* making	Both
5	Kham-alu (Banola-alu)	*Dioscorea alata*	Rhizomes	Vegetable	Domestic
6	Mahua (*Mahul*)	*Madhuca indica*	Flower	Liquor / Vegetable	Both
7			Fruit (*Kachra*)	Fruit	Both
8			Seed	Edible & body oil	Both
9	Mushroom	*Agaricus bisporus*	Plant	Vegetable	Both
10	Neel kantha	*Polygala crotalarioides*	Root	Medicinal	Domestic
11	Sal	*Shorea robusta*	Leaf	Plate making	Commercial
12			Seed	Industrial raw material	Commercial
13	Satamuli	*Asparagus racemosus*	Root	Medicinal	Domestic
14	Firewood		Leaves / Branches	Fuel	Domestic

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Harinaganj village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Anantamul	*Hemidesmus indicus*	Root	Medicinal	Domestic
2	Bahera	*Terminalia bellerica*	Fruit	Medicinal	Commercial
3	Bakhar	*Elephantopus scaber*	Whole plant & flower	Liquor	Both
4	Bhela	*Semecarpus anacardium*	Fruit	Fruit / Medicinal	Domestic
5	Kalmegh	*Andrographis paniculata*	Leaf	Medicinal	Domestic
6	Kham-alu (Bnaola)	*Dioscorea alata*	Rhizomes	Vegetable	Domestic
7	Kend	*Diospyros melanoxylon*	Fruit	Fruit	Domestic
8			Leaf	*Bidi* making	Both
9	Mahua (*Mahul*)	*Madhuca indica*	Flower	Liquor / Vegetable	Both
10			Fruit	Fruit	Domestic
11	Mushroom	*Agaricus bisporus*	Plant	Vegetable	Both
12	Piyal	*Buchanania lanzan*	Fruit	Fruit	Domestic
13	Sal	*Shorea robusta*	Gum	Plate making	Commercial
14			Leaf	Industrial raw material	Commercial
15			Seed	Miscellaneous	Both
16	Satamuli	*Asparagus racemosus*	Root	Medicinal	Domestic
17	Firewood		Leaves / Branches	Fuel	Domestic

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Kendua village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Kend	*Diospyros melanoxylon*	Leaf	*Bidi* making	Both
2	Mahua (*Mahul*)	*Madhuca indica*	Flower	Liquor / Vegetable	Both
3			Fruit	Fruit	Both
4	Mushroom	*Agaricus bisporus*	Plant	Vegetable	Both
5	Sal	*Shorea robusta*	Gum	Plate making	Both
6			Leaf	Industrial raw material	Commercial
7			Seed	Miscellaneous	Domestic
8	Firewood		Leaves / Branches	Fuel	Domestic

Data source: Based on questionnaire survey

Use and purpose of collection of NTFPs at Shushni village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Use(s) of the product	Purpose of collection
1	Anantamul	*Hemidesmus indicus*	Root	Medicinal	Domestic
2	Bhela	*Semecarpus anacardium*	Fruit	Fruit	Domestic
3	Kend	*Diospyros melanoxylon*	Leaf	*Bidi* making	Both
4	Mahua (*Mahul*)	*Madhuca indica*	Flower	Liquor / Vegetable	Both
5			Fruit	Fruit / Oil	Domestic
6	Mushroom	*Agaricus bisporus*	Plant	Vegetable	Both
7	Piyal	*Buchanania lanzan*	Fruit	Fruit	Both
8	Sal	*Shorea robusta*	Gum	Plate making	Commercial
9			Leaf	Industrial raw material	Commercial
10			Seed	Miscellaneous	Domestic
11	Firewood		Leaves / Branches	Fuel	Domestic

Data source: Based on questionnaire survey

Storage system for different NTFPs at Bhuda village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Amlaki	*Emblica officinalis*	Fruit	Collected according to domestic needs
2			Leaf	Collected according to domestic needs
3	Anantamul	*Hemidesmus indicus*	Root	Collected according to domestic needs
4	Bahera	*Terminalia bellerica*	Fruit	Collected according to domestic needs
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Collected according to domestic needs
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes	Collected according to domestic needs
7	Ban-pui	*Basella alba*	Leaf	Collected according to domestic needs
8	Bel	*Aegle marmelos*	Fruit	Villagers do not keep in their house more than a day
9			Leaf	Collected according to domestic needs
10	Bhela	*Semecarpus anacardium*	Fruit	Collected according to domestic needs
11	Dangua pan	*Smilex macrophyla*	Bark	NGOs or industrial organisations store at their own storage centre
12	Dhatki	*Woodfordia furticosa*	Flower	Collected according to domestic needs
13	Gethi-alu	*Dioscorea sp.*	Tuber root	Collected according to domestic needs
14	Ghentu	*Typhonium trilobetum*	Flower	Collected according to domestic needs
15	Haritaki	*Terminalia chebula*	Fruit	Collected according to domestic needs
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	NGOs or industrial organisations store at their own storage centre
17	Jam	*Syzyguim cumini*	Fruit	Villagers do not keep in their house more than a day
18	Kachu saag	*Colocasia esculenta*	Leaf	Collected according to domestic needs
19	Kalmegh	*Andrographis paniculata*	Leaf	Collected according to domestic needs
20	Kanakendi (Arjun)	*Terminalia arjuna*	Bark	Collected according to domestic needs
21	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Collected according to domestic needs
22	Kend	*Diospyros melanoxylon*	Fruit	Collected according to domestic needs
23			Leaf	Collected according to domestic needs
24	Khar grass	*Cucumis sativus*	Leaf	Collected according to domestic needs
25	Kukui-alu	*Dioscorea sp.*	Tuber	Collected according to domestic needs
26	Kul	*Zizyphus jujube*	Fruit	Collected according to domestic needs
27	Mahua (*Mahul*)	*Madhuca indica*	Flower	Collected according to domestic needs
28	Mushroom	*Agaricus bisporus*	Plant	Collected according to domestic needs
29	Paina lata	*Bauhinia volubilis*	Leaf	Collected according to domestic needs
30	Panja-alu	*Dioscorea sp.*	Tuber	Collected according to domestic needs
31	Piyal	*Buchanania lanzan*	Fruit	Collected according to domestic needs
32	Sal	*Shorea robusta*	Leaf	Villagers do not keep in their house more than a day
33			Flower	Collected according to domestic needs
34			Gum	Collected according to domestic needs
35	Sushuni-alu	*Dioscorea esculenta*	Tuber root	Collected according to domestic needs
36	Telhe	*Sterculia urens*	Bark	Collected according to domestic needs
37	Thara-alu	*Dioscorea sp.*	Tuber root	Collected according to domestic needs
38	Tilai		Flower	Collected according to domestic needs
39	Firewood		Leaves / Branches	Collected according to domestic needs

Data source: Based on questionnaire survey

Storage system for different NTFPs at Sirkabad village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Aam	*Mangifera indica*	Fruit	Villagers do not keep in their house more than a day
2	Amla	*Phyllanthus emblica*	Fruit	Mobile agents might store at their house for a while
3	Amlaki	*Emblica officinalis*	Fruit	Villagers do not keep in their house more than a day
4	Bahera	*Terminalia bellerica*	Fruit	Mobile agents might store at their house for a while
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Collected according to domestic needs
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes	Villagers do not keep in their house more than a day
7	Ban-pui	*Basella alba*	Leaf	Villagers do not keep in their house more than a day
8	Bel	*Aegle marmelos*	Fruit	Mobile agents might store at their house for a while
9			Leaf	Collected according to domestic needs
10	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre	NGOs or industrial organisations store at their own storage centre
11	Bhela	*Semecarpus anacardium*	Fruit	Villagers do not keep in their house more than a day
12	Dhatki	*Woodfordia furticosa*	Flower	Collected according to domestic needs
13	Gethi-alu	*Dioscorea sp.*	Tuber root	Collected according to domestic needs
14	Haritaki	*Terminalia chebula*	Fruit	NGOs or industrial organisations store at their own storage centre
15	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre	NGOs or industrial organisations store at their own storage centre
16	Jam	*Syzyguim cumini*	Fruit	Mobile agents might store at their house for a while
17	Jihur	*Lanea grandis*	Flower	Collected according to domestic needs
18	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Villagers do not keep in their house more than a day
19	Kend	*Diospyros melanoxylon*	Leaf	LAMPS store at their own storage centre or mobile agents store at their house for a while
20	Keoa	*Costus speciosus*	Flower	Collected according to domestic needs
21	Khair	*Acacia catechu*	Bark / Fibre	Mobile agents might store at their house for a while
22	Kul	*Zizyphus jujube*	Fruit	Villagers do not keep in their house more than a day
23	Kulekhara	*Hygrophila auriculata*	Leaf	Collected according to domestic needs
24	Kurchi	*Holarrhena antidysenterica*	Seed	NGOs or industrial organisations store at their own storage centre
25	Piyal	*Buchanania lanzan*	Fruit	Collected according to domestic needs
26			Leaf	Collected according to domestic needs
27	Ram basak	*Phlogacanthus thyrsiformis*	Fruit	Collected according to domestic needs
28	Sal	*Shorea robusta*	Branch	Mobile agents might store at their house for a while
29			Leaf	Villagers do not keep in their house more than a day
30			Seed	LAMPS store at their own storage centre or mobile agents store at their house for a while
31	Satamuli	*Asparagus racemosus*	Root	Collected according to domestic needs
32	Sidha	*Lagerstoemia parviflora*	Fruit	Mobile agents might store at their house for a while
33	Firewood		Leaves / Branches	Villagers do not keep in their house more than a day

Data source: Based on questionnaire survey

Storage system for different NTFPs at Kalaboni village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Gethi-alu	*Dioscorea sp.*	Tuber root	Villagers do not keep in their house more than a day
2	Sal	*Shorea robusta*	Leaf	Mobile agents might store at their house for a while
3	Firewood		Leaves / Branches	Villagers do not keep in their house more than a day

Data source: Based on questionnaire survey

Storage system for different NTFP at Gurahata village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Aam	*Mangifera indica*	Fruit	Villagers do not keep in their house more than a day
2	Amla	*Phyllanthus emblica*	Fruit	Mobile agents might store at their house for a while
3	Anantamul	*Hemidesmus indicus*	Root	Collected according to domestic needs
4	Bahera	*Terminalia bellerica*	Fruit	Mobile agents might store at their house for a while
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Collected according to domestic needs
6	Ban-khajur	*Phoenix acaulis*	Fruit	Villagers do not keep in their house more than a day
7	Ban-pui	*Basella alba*	Leaf	Collected according to domestic needs
8	Bel	*Aegle marmelos*	Fruit	Villagers do not keep in their house more than a day
9	Bhela	*Semecarpus anacardium*	Fruit	Collected according to domestic needs
10	Gethi-alu	*Dioscorea sp.*	Tuber root	Collected according to domestic needs
11	Ghang (Kihor)	*Phaneria vialii*	Fruit	Collected according to domestic needs
12			Leaf	Collected according to domestic needs
13	Haritaki	*Terminalia chebula*	Fruit	NGOs or industrial organisations store at their own storage centre
14	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre	NGOs or industrial organisations store at their own storage centre
15	Jam	*Syzyguim cumini*	Fruit	Mobile agents might store at their house for a while
16	Kalmegh	*Andrographis paniculata*	Leaf	NGOs or industrial organisations store at their own storage centre
17	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Collected according to domestic needs
18	Kath pan	*Eresia lebis*	Bark / Fibre	NGOs or industrial organisations store at their own storage centre
19	Kend	*Diospyros melanoxylon*	Fruit	Villagers do not keep in their house more than a day
20			Leaf	LAMPS store at their own storage centre or mobile agents store at their house for a while
21	Khejur Jhuti	*Phoenix sp.*	Leaf	Collected according to domestic needs
22	Kukui-alu (Kurang/Kharia)	*Dioscorea sp.*	Tuber root	Collected according to domestic needs
23	Kul	*Zizyphus jujube*	Fruit	Villagers do not keep in their house more than a day
24	Kurchi	*Holarrhena antidysenterica*	Fruit	Mobile agents might store at their house for a while
25	Piyal	*Buchanania lanzan*	Fruit	Collected according to domestic needs
26	Sal	*Shorea robusta*	Leaf	Mobile agents might store at their house for a while
27	Sushuni-alu (Tinputura-alu)	*Dioscorea esculenta*	Tuber root	Collected according to domestic needs
28	Satamuli	*Asparagus racemosus*	Root	Collected according to domestic needs
29	Firewood		Leaves / Branches	Villagers do not keep in their house more than a day

Data source: Based on questionnaire survey

Storage system for different NTFPs at Jamdaha village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Amlaki	*Emblica officinalis*	Fruit	Villagers do not keep in their house more than a day
2	Anantamul	*Hemidesmus indicus*	Root	Mobile agents might store at their house for a while
3	Arjun	*Terminalia arjuna*	Bark / Fibre	NGOs or industrial organisations store at their own storage centre
4	Bahera	*Terminalia bellerica*	Fruit	Mobile agents might store at their house for a while
5	Ban-Khajur	*Phoenix acaulis*	Fruit	Collected according to domestic needs
6			Leaf	Collected according to domestic needs
7	Ban-kundri	*Coccinia grandis*	Fruit	Villagers do not keep in their house more than a day
8	Bangla-alu	*Dioscorea bulbifera*	Tuber root	Collected according to domestic needs
9	Ban-pui	*Basella alba*	Leaf	Collected according to domestic needs
10	Bhela	*Semecarpus anacardium*	Fruit	Collected according to domestic needs
11			Seed	Collected according to domestic needs
12	Bhencha		Fruit	Villagers do not keep in their house more than a day
13	Bhurru	*Gardenia gummifera*	Fruit	Villagers do not keep in their house more than a day
14	*Dhumpu*	*Sicus lacore*	Tuber root	Villagers do not keep in their house more than a day
15	Haritaki	*Terminalia chebula*	Fruit	Mobile agents might store at their house for a while
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	NGOs or industrial organisations store at their own storage centre
17	Jam	*Syzyguim cumini*	Fruit	Villagers do not keep in their house more than a day
18	Kalmegh	*Andrographis paniculata*	Leaf	NGOs or industrial organisations store at their own storage centre
19	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Villagers do not keep in their house more than a day
20	Kend	*Diospyros melanoxylon*	Fruit	Mobile agents might store at their house for a while
21			Leaf	Mobile agents might store at their house for a while
22	Kurchi	*Holarrhena antidysenterica*	Bark	Villagers do not keep in their house more than a day
23			Fruit	NGOs or industrial organisations store at their own storage centre
24	Kusum	*Schleichera oleosa*	Seed	Villagers do not keep in their house more than a day
25	Lodh	*Symplocos racemosa*	Bark / Fibre	NGOs or industrial organisations store at their own storage centre
26	Mahua (*Mahul*)	*Madhuca indica*	Flower	Mobile agents might store at their house for a while
27			Fruit (*Kachra*)	Mobile agents might store at their house for a while
28	Mushroom	*Agaricus bisporus*	Plant	Mobile agents might store at their house for a while
29	Parashi	*Cleistanthus collinus*	Leaf	Mobile agents might store at their house for a while
30	Pia-sal	*Pterocarpus marsupium*	Leaf	Collected according to domestic needs
31	Piyal	*Buchanania lanzan*	Fruit	Mobile agents might store at their house for a while
32			Seed	Villagers do not keep in their house more than a day
33	Sal	*Shorea robusta*	Flower	Collected according to domestic needs
34			Leaf	Mobile agents might store at their house for a while
35			Seed	NGOs or industrial organisations store at their own storage centre
36	Satamuli	*Asparagus racemosus*	Root	NGOs or industrial organisations store at their own storage centre
37	Firewood		Leaves / Branches	Villagers do not keep in their house more than a day

Data source: Based on questionnaire survey

Storage system for different NTFPs at Barudi village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Ban-kundri	*Coccinia grandis*	Fruit	Villagers do not keep in their house more than a day
2	Bat	*Ficus bengalensis*	Fruit	Collected according to domestic needs
3			Leaf	Collected according to domestic needs
4	Bel	*Aegle marmelos*	Fruit	Mobile agents might store at their house for a while
5			Leaf	Collected according to domestic needs
6	Bhencha		Fruit	Collected according to domestic needs
7	Bhurru	*Gardenia gummifera*	Fruit	Villagers do not keep in their house more than a day
8	Dumur	*Ficus hispida*	Fruit	Collected according to domestic needs
9	Ghee karla	*Momordica dioica*	Fruit	Mobile agents might store at their house for a while
10	Kend	*Diospyros melanoxylon*	Fruit	Mobile agents might store at their house for a while
11			Leaf	Mobile agents might store at their house for a while
12	Mahua (*Mahul*)	*Madhuca indica*	Flower	Mobile agents might store at their house for a while
13			Fruit (*Kachra*)	Villagers do not keep in their house more than a day
14	Mushroom	*Agaricus bisporus*	Plant	Mobile agents might store at their house for a while
15	Piyal	*Buchanania lanzan*	Fruit	Mobile agents might store at their house for a while
16	Sal	*Shorea robusta*	Leaf	Mobile agents might store at their house for a while
17	Firewood		Leaves / Branches	Villagers do not keep in their house more than a day

Data source: Based on questionnaire survey

Storage system for different NTFPs at Katiam village, Ranibandh range, Bankura district

Sl No	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Amla	*Phyllanthus emblica*	Fruit	Mobile agents might store at their house for a while
2	Anantamul	*Hemidesmus indicus*	Root	NGOs or industrial organisations store at their own storage centre
3	Bahera	*Terminalia bellerica*	Fruit	NGOs or industrial organisations store at their own storage centre
4	Ban-Khajur	*Phoenix acaulis*	Fruit	Villagers do not keep in their house more than a day
5			Leaf	Mobile agents might store at their house for a while
6	Ban-kundri	*Coccinia grandis*	Fruit	Villagers do not keep in their house more than a day
7	Ban-alu	*Dioscorea bulbifera*	Tuber root	Villagers do not keep in their house more than a day
8	Ban-kumro		Fruit	Villagers do not keep in their house more than a day
9	Ban-piyanj	*Allium sp.*	Stem	Mobile agents might store at their house for a while
10	Ban-rasun	*Allium ampeloprasum*	Stem	Villagers do not keep in their house more than a day
11	Bel	*Aegle marmelos*	Fruit	Mobile agents might store at their house for a while
12	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre	NGOs or industrial organisations store at their own storage centre
13			Fruit	NGOs or industrial organisations store at their own storage centre
14	Bhela	*Semecarpus anacardium*	Fruit	Collected according to domestic needs
15			Seed	NGOs or industrial organisations store at their own storage centre
16	Bhencha		Fruit	Villagers do not keep in their house more than a day
17	Bhurru	*Gardenia gummifera*	Fruit	Mobile agents might store at their house for a while
18	Dhatki	*Woodfordia furticosa*	Flower	Mobile agents might store at their house for a while
19	Dumur	*Ficus hispida*	Fruit	Villagers do not keep in their house more than a day
20	Ghee karla	*Momordica dioica*	Fruit	Mobile agents might store at their house for a while
21	Haritaki	*Terminalia chebula*	Fruit	NGOs or industrial organisations store at their own storage centre
22	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	NGOs or industrial organisations store at their own storage centre
23	Iswarimul	*Aristolochia indica*	Root	NGOs or industrial organisations store at their own storage centre
24	Jam	*Syzyguim cumini*	Fruit	Mobile agents might store at their house for a while
25	Jihur (Jirul)	*Lanea grandis*	Flower	Villagers do not keep in their house more than a day
26	Kalmegh	*Andrographis paniculata*	Leaf	NGOs or industrial organisations store at their own storage centre
27	Kend	*Diospyros melanoxylon*	Fruit	Mobile agents might store at their house for a while
28			Leaf	LAMPS store at their own storage centre or mobile agents store at their house for a while
29	Kurchi	*Holarrhena antidysenterica*	Fruit	Mobile agents might store at their house for a while
30	Lodh	*Symplocos racemosa*	Bark / Fibre	NGOs or industrial organisations store at their own storage centre
31	Mushroom	*Agaricus bisporus*	Plant	Mobile agents might store at their house for a while
32	Nageswar	*Desmodium motorium*	Leaf	Mobile agents might store at their house for a while
33	Neel kantha	*Polygala crotalarioides*	Root	NGOs or industrial organisations store at their own storage centre
34	Palash	*Butea monosperma*	Flower	Collected according to domestic needs
35	Piyal	*Buchanania lanzan*	Fruit	Mobile agents might store at their house for a while
36	Ramdatunermul	*Smilax ovalifolia*	Root	NGOs or industrial organisations store at their own storage centre
37	Sal	*Shorea robusta*	Leaf	Mobile agents might store at their house for a while
38			Seed	LAMPS store at their own storage centre or mobile agents store at their house for a while
39	Satamuli	*Asparagus racemosus*	Root	NGOs or industrial organisations store at their own storage centre
40	Simul	*Bombax malabaricum*	Flower	NGOs or industrial organisations store at their own storage centre
41	Tilai		Flower	Villagers do not keep in their house more than a day
42	Firewood		Leaves / Branches	Villagers do not keep in their house more than a day

Data source: Based on questionnaire survey

Storage system for different NTFPs at Dakshinsol village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Anantamul	*Hemidesmus indicus*	Root	Collected according to domestic needs
2	Bhela	*Semecarpus anacardium*	Fruit	Collected according to domestic needs
3	Iswarimul	*Aristolochia indica*	Root	Collected according to domestic needs
4	Kend	*Diospyros melanoxylon*	Leaf	Mobile agents might store at their house for a while
5	Kham-alu (Banola-alu)	*Dioscorea alata*	Rhizomes	Collected according to domestic needs
6	Mahua (*Mahul*)	*Madhuca indica*	Flower	Mobile agents might store at their house for a while
7			Fruit (*Kachra*)	Mobile agents might store at their house for a while
8			Seed	Mobile agents might store at their house for a while
9	Mushroom	*Agaricus bisporus*	Plant	Mobile agents might store at their house for a while
10	Neel kantha	*Polygala crotalarioides*	Root	Collected according to domestic needs
11	Sal	*Shorea robusta*	Leaf	Mobile agents might store at their house for a while
12			Seed	Mobile agents might store at their house for a while
13	Satamuli	*Asparagus racemosus*	Root	Collected according to domestic needs
14	Firewood		Leaves / Branches	Collected according to domestic needs

Data source: Based on questionnaire survey

Storage system for different NTFP at Harinaganj village in Jamboni range of West Midnapur district

	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Anantamul	*Hemidesmus indicus*	Root	Collected according to domestic needs
2	Bahera	*Terminalia bellerica*	Fruit	Mobile agents might store at their house for a while
3	Bakhar	*Elephantopus scaber*	Whole plant & flower	Villagers do not keep in their house more than a day
4	Bhela	*Semecarpus anacardium*	Fruit	Collected according to domestic needs
5	Kalmegh	*Andrographis paniculata*	Leaf	Collected according to domestic needs
6	Kham-alu (Bnaola)	*Dioscorea alata*	Rhizomes	Collected according to domestic needs
7	Kend	*Diospyros melanoxylon*	Fruit	Collected according to domestic needs
8			Leaf	Mobile agents might store at their house for a while
9	Mahua (*Mahul*)	*Madhuca indica*	Flower	Villagers do not keep in their house more than a day
10			Fruit	Villagers do not keep in their house more than a day
11	Mushroom	*Agaricus bisporus*	Plant	Mobile agents might store at their house for a while
12	Piyal	*Buchanania lanzan*	Fruit	Collected according to domestic needs
13	Sal	*Shorea robusta*	Gum	Mobile agents might store at their house for a while
14			Leaf	Mobile agents might store at their house for a while
15			Seed	Villagers do not keep in their house more than a day
16	Satamuli	*Asparagus racemosus*	Root	Collected according to domestic needs
17	Firewood		Leaves / Branches	Collected according to domestic needs

Data source: Based on questionnaire survey

Storage system for different NTFP at Kendua village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Kend	*Diospyros melanoxylon*	Leaf	Mobile agents might store at their house for a while
2	Mahua (*Mahul*)	*Madhuca indica*	Flower	Mobile agents might store at their house for a while
3			Fruit	Mobile agents might store at their house for a while
4	Mushroom	*Agaricus bisporus*	Plant	Villagers do not keep in their house more than a day
5	Sal	*Shorea robusta*	Gum	Mobile agents might store at their house for a while
6			Leaf	Mobile agents might store at their house for a while
7			Seed	Collected according to domestic needs
8	Firewood		Leaves / Branches	Collected according to domestic needs

Data source: Based on questionnaire survey

Storage system for different NTFP at Shushni village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Storage system
1	Anantamul	*Hemidesmus indicus*	Root	Collected according to domestic needs
2	Bhela	*Semecarpus anacardium*	Fruit	Collected according to domestic needs
3	Kend	*Diospyros melanoxylon*	Leaf	Mobile agents might store at their house for a while
4	Mahua (*Mahul*)	*Madhuca indica*	Flower	Mobile agents might store at their house for a while
5			Fruit	Collected according to domestic needs
6	Mushroom	*Agaricus bisporus*	Plant	Mobile agents might store at their house for a while
7	Piyal	*Buchanania lanzan*	Fruit	Mobile agents might store at their house for a while
8	Sal	*Shorea robusta*	Gum	Mobile agents might store at their house for a while
9			Leaf	Mobile agents might store at their house for a while
10			Seed	Collected according to domestic needs
11	Firewood		Leaves / Branches	Collected according to domestic needs

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Bhuda village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Amlaki	*Emblica officinalis*	Fruit	Collected for domestic use only, is not sold	
2			Leaf	Collected for domestic use only, is not sold	
3	Anantamul	*Hemidesmus indicus*	Root	Collected for domestic use only, is not sold	
4	Bahera	*Terminalia bellerica*	Fruit	Collected for domestic use only, is not sold	
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Collected for domestic use only, is not sold	
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes	Collected for domestic use only, is not sold	
7	Ban-pui	*Basella alba*	Leaf	Collected for domestic use only, is not sold	
8	Bel	*Aegle marmelos*	Fruit	Villagers sell to purchasers at the local market	2/-kg
9			Leaf	Collected for domestic use only, is not sold	
10	Bhela	*Semecarpus anacardium*	Fruit	Collected for domestic use only, is not sold	
11	Dangua pan	*Smilex macrophyla*	Bark	Mobile agents come to the village to collect from villagers / NGOs or industrial organisations collect from villagers at the village	5/-kg
12	Dhatki	*Woodfordia furticosa*	Flower	Collected for domestic use only, is not sold	
13	Gethi-alu	*Dioscorea sp.*	Tuber root	Collected for domestic use only, is not sold	
14	Ghentu	*Typhonium trilobetum*	Flower	Collected for domestic use only, is not sold	
15	Haritaki	*Terminalia chebula*	Fruit	Collected for domestic use only, is not sold	
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	Mobile agents come to the village to collect from villagers / NGOs or industrial organisations collect from villagers at the village	10/-kg
17	Jam	*Syzyguim cumini*	Fruit	Villagers sell to purchasers at the local market	2/-kg
18	Kachu saag	*Colocasia esculenta*	Leaf	Collected for domestic use only, is not sold	
19	Kalmegh	*Andrographis paniculata*	Leaf	Collected for domestic use only, is not sold	
20	Kanakendi (Arjun)	*Terminalia arjuna*	Bark	Collected for domestic use only, is not sold	
21	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Collected for domestic use only, is not sold	
22	Kend	*Diospyros melanoxylon*	Fruit	Collected for domestic use only, is not sold	
23			Leaf	Collected for domestic use only, is not sold	
24	Khar grass	*Cucumis sativus*	Leaf	Collected for domestic use only, is not sold	
25	Kukui-alu	*Dioscorea sp.*	Tuber	Collected for domestic use only, is not sold	
26	Kul	*Zizyphus jujube*	Fruit	Collected for domestic use only, is not sold	
27	Mahua (*Mahul*)	*Madhuca indica*	Flower	Collected for domestic use only, is not sold	
28	Mushroom	*Agaricus bisporus*	Plant	Collected for domestic use only, is not sold	
29	Paina lata	*Bauhinia volubilis*	Leaf	Collected for domestic use only, is not sold	
30	Panja-alu	*Dioscorea sp.*	Tuber	Collected for domestic use only, is not sold	
31	Piyal	*Buchanania lanzan*	Fruit	Collected for domestic use only, is not sold	
32	Sal	*Shorea robusta*	Leaf	Villagers sell to purchasers at the local market	45/- 1000 plates
33			Flower	Collected for domestic use only, is not sold	
34			Gum	Collected for domestic use only, is not sold	
35	Sushuni-alu	*Dioscorea esculenta*	Tuber root	Collected for domestic use only, is not sold	
36	Telhe	*Sterculia urens*	Bark	Collected for domestic use only, is not sold	
37	Thara-alu	*Dioscorea sp.*	Tuber root	Collected for domestic use only, is not sold	
38	Tilai		Flower	Collected for domestic use only, is not sold	
39	Firewood		Leaves / Branches	Collected for domestic use only, is not sold	

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Sirkabad village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Aam	*Mangifera indica*	Fruit	Villagers sell to purchasers at the local market	5/-kg
2	Amla	*Phyllanthus emblica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	3/-kg
3	Amlaki	*Emblica officinalis*	Fruit	Villagers sell to purchasers at the local market	4/-kg
4	Bahera	*Terminalia bellerica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	2/-kg
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Collected for domestic use only, is not sold	
6	Ban-ole	*Amorphophallus sylvaticus*	Rhizomes	Villagers sell to purchasers at the local market	5/-kg
7	Ban-pui	*Basella alba*	Leaf	Villagers sell to purchasers at the local market	2/-kg
8	Bel	*Aegle marmelos*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	2/-kg
9			Leaf	Collected for domestic use only, is not sold	
10	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	10/-kg
11	Bhela	*Semecarpus anacardium*	Fruit	Villagers sell to purchasers at the local market	2/-kg
12	Dhatki	*Woodfordia furticosa*	Flower	Collected for domestic use only, is not sold	
13	Gethi-alu	*Dioscorea sp.*	Tuber root	Collected for domestic use only, is not sold	
14	Haritaki	*Terminalia chebula*	Fruit	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	2/-kg
15	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	15/-kg
16	Jam	*Syzyguim cumini*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	5/-kg
17	Jihur	*Lanea grandis*	Flower	Collected for domestic use only, is not sold	
18	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Villagers sell to purchasers at the local market	2/-kg
19	Kend	*Diospyros melanoxylon*	Leaf	Villagers sell to LAMPS or mobile agents come to the village to purchase from villagers	25/-*Chata*
20	Keoa	*Costus speciosus*	Flower	Collected for domestic use only, is not sold	
21	Khair	*Acacia catechu*	Bark / Fibre	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	3/-kg
22	Kul	*Zizyphus jujube*	Fruit	Villagers sell to purchasers at the local market	5/-kg
23	Kulekhara	*Hygrophila auriculata*	Leaf	Collected for domestic use only, is not sold	
24	Kurchi	*Holarrhena antidysenterica*	Seed	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	3/-kg
25	Piyal	*Buchanania lanzan*	Fruit	Collected for domestic use only, is not sold	
26			Leaf	Collected for domestic use only, is not sold	
27	Ram basak	*Phlogacanthus thyrsiformis*	Fruit	Collected for domestic use only, is not sold	
28	Sal	*Shorea robusta*	Branch	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	60/1000 plates
29			Leaf	Villagers sell to purchasers at the local market	2/- Bundle
30			Seed	Villagers sell to LAMPS or mobile agents come to the village to purchase from villagers	2/-kg
31	Satamuli	*Asparagus racemosus*	Root	Collected for domestic use only, is not sold	
32	Sidha	*Lagerstoemia parviflora*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	2/-kg
33	Firewood		Leaves / Branches	Villagers sell to purchasers at the local market	1.50/-kg

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Kalaboni village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Gethi-alu	*Dioscorea sp.*	Tuber root	Villagers sell to purchasers at the local market	2/-kg
2	Sal	*Shorea robusta*	Leaf	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	60/- 1000 plates
3	Firewood		Leaves / Branches	Villagers sell to purchasers at the local market	1.50/-kg

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Gurahata village, Arsha range, Purulia district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Aam	*Mangifera indica*	Fruit	Villagers sell to purchasers at the local market	5/-kg
2	Amla	*Phyllanthus emblica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	3/-kg
3	Anantamul	*Hemidesmus indicus*	Root	Collected for domestic use only, is not sold	
4	Bahera	*Terminalia bellerica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	2/-kg
5	Baunla-alu (Khamalu)	*Dioscorea bulbifera*	Tuber root	Collected for domestic use only, is not sold	
6	Ban-khajur	*Phoenix acaulis*	Fruit	Villagers sell to purchasers at the local market	7/-kg
7	Ban-pui	*Basella alba*	Leaf	Collected for domestic use only, is not sold	
8	Bel	*Aegle marmelos*	Fruit	Villagers sell to purchasers at the local market	2/-kg
9	Bhela	*Semecarpus anacardium*	Fruit	Collected for domestic use only, is not sold	
10	Gethi-alu	*Dioscorea sp.*	Tuber root	Collected for domestic use only, is not sold	
11	Ghang (Kihor)	*Phaneria vialii*	Fruit	Collected for domestic use only, is not sold	
12			Leaf	Collected for domestic use only, is not sold	
13	Haritaki	*Terminalia chebula*	Fruit	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	2/-kg
14	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark / Fibre	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	20/-kg
15	Jam	*Syzyguim cumini*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	3/-kg
16	Kalmegh	*Andrographis paniculata*	Leaf	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	2/-kg
17	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Collected for domestic use only, is not sold	
18	Kath pan	*Eresia lebis*	Bark / Fibre	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	20/-kg
19	Kend	*Diospyros melanoxylon*	Fruit	Villagers sell to purchasers at the local market	1/- *Khala* (packet)
20			Leaf	Villagers sell to LAMPS or mobile agents come to the village to purchase from villagers	25/- *Chata*
21	Khejur Jhuti	*Phoenix sp.*	Leaf	Collected for domestic use only, is not sold	
22	Kukui-alu (Kurang/Kharia)	*Dioscorea sp.*	Tuber root	Collected for domestic use only, is not sold	
23	Kul	*Zizyphus jujube*	Fruit	Villagers sell to purchasers at the local market	3/-kg
24	Kurchi	*Holarrhena antidysenterica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	4/-kg
25	Piyal	*Buchanania lanzan*	Fruit	Collected for domestic use only, is not sold	
26	Sal	*Shorea robusta*	Leaf	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	55/- 1000
27	Sushuni-alu (Tinputura-alu)	*Dioscorea esculenta*	Tuber root	Collected for domestic use only, is not sold	
28	Satamuli	*Asparagus racemosus*	Root	Collected for domestic use only, is not sold	
29	Firewood		Leaves / Branches	Villagers sell to purchasers at the local market	2/-kg

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Jamdaha village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Amlaki	*Emblica officinalis*	Fruit	Villagers sell to purchasers at the local market	1.5/- kg
2	Anantamul	*Hemidesmus indicus*	Root	Mobile agents come to the village to collect from villagers	10/-kg
3	Arjun	*Terminalia arjuna*	Bark / Fibre	NGOs or industrial organisations collect from villagers at the village	1.5/-kg
4	Bahera	*Terminalia bellerica*	Fruit	Mobile agents come to the village to collect from villagers	1.5/-kg
5	Ban-Khajur	*Phoenix acaulis*	Fruit	Collected for domestic use only, is not sold	
6			Leaf	Collected for domestic use only, is not sold	
7	Ban-kundri	*Coccinia grandis*	Fruit	Villagers sell to purchasers at the local market	20/-kg
8	Bangla-alu	*Dioscorea bulbifera*	Tuber root	Collected for domestic use only, is not sold	
9	Ban-pui	*Basella alba*	Leaf	Collected for domestic use only, is not sold	
10	Bhela	*Semecarpus anacardium*	Fruit	Collected for domestic use only, is not sold	
11			Seed	Collected for domestic use only, is not sold	
12	Bhencha		Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	10/-kg
13	Bhurru	*Gardenia gummifera*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	5/-kg
14	*Dhumpu*	*Sicus lacore*	Tuber root	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	7/-kg
15	Haritaki	*Terminalia chebula*	Fruit	Mobile agents come to the village to collect from villagers	1.5/-kg
16	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	NGOs or industrial organisations collect from villagers at the village	20/-kg
17	Jam	*Syzyguim cumini*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	2/-kg
18	Kalmegh	*Andrographis paniculata*	Leaf	Mobile agents come to the village to collect from villagers / NGOs or industrial organisations collect from villagers at the village	1.5/-kg
19	Kanchan (*Kural*)	*Bauhinia purpurea*	Leaf	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	
20	Kend	*Diospyros melanoxylon*	Fruit	Mobile agents come to the village to collect from villagers	10/-kg
21			Leaf	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	20/-*Chata*
22	Kurchi	*Holarrhena antidysenterica*	Bark	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	2/-kg
23			Fruit	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	2/-kg
24	Kusum	*Schleichera oleosa*	Seed	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	4/-kg
25	Lodh	*Symplocos racemosa*	Bark / Fibre	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	4/-kg
26	Mahua (*Mahul*)	*Madhuca indica*	Flower	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	8/-kg
27			Fruit (*Kachra*)	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	6/-kg
28	Mushroom	*Agaricus bisporus*	Plant	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	20/-kg
29	Parashi	*Cleistanthus collinus*	Leaf	Collected for domestic use only, is not sold	
30	Pia-sal	*Pterocarpus marsupium*	Leaf	Collected for domestic use only, is not sold	
31	Piyal	*Buchanania lanzan*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	4/-kg
32			Seed	Villagers sell to purchasers at the local market	5/-kg
33	Sal	*Shorea robusta*	Flower	Collected for domestic use only, is not sold	
34			Leaf	Mobile agents come to the village to collect from villagers	60/-1000 plates
35			Seed	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	1kg salt / Tin of fruit
36	Satamuli	*Asparagus racemosus*	Root	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	10/-kg
37	Firewood		Leaves / Branches	Villagers sell to purchasers at the local market	1.5/-kg

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Barudi village, Ranibandh range, Bankura district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price / Unit of products (Rs.)
1	Ban-kundri	*Coccinia grandis*	Fruit	Villagers sell to purchasers at the local market	50/- kg
2	Bat	*Ficus bengalensis*	Fruit	Collected for domestic use only, is not sold	
3			Leaf	Collected for domestic use only, is not sold	
4	Bel	*Aegle marmelos*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	
5			Leaf	Collected for domestic use only, is not sold	
6	Bhencha		Fruit	Collected for domestic use only, is not sold	
7	Bhurru	*Gardenia gummifera*	Fruit	Villagers sell to purchasers at the local market	8/- kg
8	Dumur	*Ficus hispida*	Fruit	Collected for domestic use only, is not sold	
9	Ghee karla	*Momordica dioica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	
10	Kend	*Diospyros melanoxylon*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	1/- 4 pieces
11			Leaf	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	20/- *Chata* (Bundle)
12	Mahua (*Mahul*)	*Madhuca indica*	Flower	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	5/- kg
13			Fruit (*Kachra*)	Villagers sell to purchasers at the local market	8/- kg
14	Mushroom	*Agaricus bisporus*	Plant	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	40/- kg
15	Piyal	*Buchanania lanzan*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	10/-kg
16	Sal	*Shorea robusta*	Leaf	Mobile agents come to the village to collect from villagers	70/- 1000 plates
17	Firewood		Leaves / Branches	Villagers sell to purchasers at the local market	1/- kg

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Katiam village, Ranibandh range, Bankura district

Sl No	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price / Unit of products (Rs.)
1	Amla	*Phyllanthus emblica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	2/-kg
2	Anantamul	*Hemidesmus indicus*	Root	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	2.5/-kg
3	Bahera	*Terminalia bellerica*	Fruit	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	1/-kg
4	Ban-Khajur	*Phoenix acaulis*	Fruit	Villagers sell to purchasers at the local market	30/-kg
5			Leaf	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	
6	Ban-kundri	*Coccinia grandis*	Fruit	Villagers sell to purchasers at the local market	25/-kg
7	Ban-alu	*Dioscorea bulbifera*	Tuber root	Villagers sell to purchasers at the local market	15/-kg
8	Ban-kumro		Fruit	Villagers sell to purchasers at the local market	10/-kg
9	Ban-piyanj	*Allium sp.*	Stem	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	40/-kg
10	Ban-rasun	*Allium ampeloprasum*	Stem	Villagers sell to purchasers at the local market	40/-kg
11	Bel	*Aegle marmelos*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	2/-kg
12	Bhaluksukti	*Oroxylum indicum*	Bark / Fibre	NGOs or industrial organisations collect from villagers at the village	1.5/-kg
13			Fruit	NGOs or industrial organisations collect from villagers at the village	5/-kg
14	Bhela	*Semecarpus anacardium*	Fruit	Collected for domestic use only, is not sold	
15			Seed	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	2/-kg
16	Bhencha		Fruit	Villagers sell to purchasers at the local market	30/-kg
17	Bhurru	*Gardenia gummifera*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	20/-kg
18	Dhatki	*Woodfordia furticosa*	Flower	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	3/-kg
19	Dumur	*Ficus hispida*	Fruit	Villagers sell to purchasers at the local market	5/-kg
20	Ghee karla	*Momordica dioica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	40/-kg
21	Haritaki	*Terminalia chebula*	Fruit	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	1.5/-kg
22	Harla (Haila/Panja)	*Holloptelia integrifolia*	Bark	NGOs or industrial organisations collect from villagers at the village	2/-kg
23	Iswarimul	*Aristolochia indica*	Root	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	3/-kg
24	Jam	*Syzyguim cumini*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	10/-kg
25	Jihur (Jirul)	*Lanea grandis*	Flower	Villagers sell to purchasers at the local market	30/-kg
26	Kalmegh	*Andrographis paniculata*	Leaf	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	1.5/-kg
27	Kend	*Diospyros melanoxylon*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	1/- 4 piece
28			Leaf	Villagers sell to LAMPS or mobile agents come to the village to purchase from villagers	30/- *Chata*
29	Kurchi	*Holarrhena antidysenterica*	Fruit	Mobile agents come to the village to collect from villagers	2/-kg
30	Lodh	*Symplocos racemosa*	Bark / Fibre	NGOs or industrial organisations collect from villagers at the village	2/-kg
31	Mushroom	*Agaricus bisporus*	Plant	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	50/-kg
32	Nageswar	*Desmodium motorium*	Leaf	Mobile agents come to the village to collect from villagers	30/-kg
33	Neel kantha	*Polygala crotalarioides*	Root	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	30/-kg
34	Palash	*Butea monosperma*	Flower	Collected for domestic use only, is not sold	1/-kg
35	Piyal	*Buchanania lanzan*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	20/-kg
36	Ramdatunermul	*Smilax ovalifolia*	Root	NGOs or industrial organisations collect from villagers at the village	1.5/-kg
37	Sal	*Shorea robusta*	Leaf	Mobile agents come to the village to collect from villagers	80/- 1000 plates
38			Seed	Villagers sell to LAMPS or mobile agents come to the village to purchase from villagers	1.5/-kg
39	Satamuli	*Asparagus racemosus*	Root	NGOs or industrial organisations collect from villagers at the village / Mobile agents come to the village to collect from villagers	1.5/-kg
40	Simul	*Bombax malabaricum*	Flower	NGOs or industrial organisations collect from villagers at the village	1/-kg
41	Tilai		Flower	Villagers sell to purchasers at the local market	80/-kg; 2/- bundle
42	Firewood		Leaves / Branches	Villagers sell to purchasers at the local market	2/-kg

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Dakshinsol village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Anantamul	*Hemidesmus indicus*	Root	Collected for domestic use only, is not sold	
2	Bhela	*Semecarpus anacardium*	Fruit	Collected for domestic use only, is not sold	
3	Iswarimul	*Aristolochia indica*	Root	Collected for domestic use only, is not sold	
4	Kend	*Diospyros melanoxylon*	Leaf	Mobile agents come to the village to collect from villagers	30/- *Chata*
5	Kham-alu (Banola-alu)	*Dioscorea alata*	Rhizomes	Collected for domestic use only, is not sold	
6	Mahua (*Mahul*)	*Madhuca indica*	Flower	Mobile agents come to the village to collect from villagers	10/-kg
7			Fruit (*Kachra*)	Mobile agents come to the village to collect from villagers	10/-kg
8			Seed	Mobile agents come to the village to collect from villagers	8/-kg
9	Mushroom	*Agaricus bisporus*	Plant	Mobile agents come to the village to collect from villagers	20/-kg
10	Neel kantha	*Polygala crotalarioides*	Root	Collected for domestic use only, is not sold	
11	Sal	*Shorea robusta*	Leaf	Mobile agents come to the village to collect from villagers	60/- 1000 plates
12			Seed	Mobile agents come to the village to collect from villagers	5/-kg
13	Satamuli	*Asparagus racemosus*	Root	Collected for domestic use only, is not sold	
14	Firewood		Leaves / Branches	Collected for domestic use only, is not sold	

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Harinaganj village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Anantamul	*Hemidesmus indicus*	Root	Collected for domestic use only, is not sold	
2	Bahera	*Terminalia bellerica*	Fruit	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	5/-kg
3	Bakhar	*Elephantopus scaber*	Whole plant & flower	Villagers sell to purchasers at the local market	10/-kg
4	Bhela	*Semecarpus anacardium*	Fruit	Collected for domestic use only, is not sold	
5	Kalmegh	*Andrographis paniculata*	Leaf	Collected for domestic use only, is not sold	
6	Kham-alu (Bnaola)	*Dioscorea alata*	Rhizomes	Collected for domestic use only, is not sold	
7	Kend	*Diospyros melanoxylon*	Fruit	Collected for domestic use only, is not sold	
8			Leaf	Mobile agents come to the village to collect from villagers	30/- *Chata*
9	Mahua (*Mahul*)	*Madhuca indica*	Flower	Villagers sell to purchasers at the local market	10/-kg
10			Fruit	Villagers sell to purchasers at the local market	
11	Mushroom	*Agaricus bisporus*	Plant	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	20/-kg
12	Piyal	*Buchanania lanzan*	Fruit	Collected for domestic use only, is not sold	
13	Sal	*Shorea robusta*	Gum	Mobile agents come to the village to collect from villagers	50/- 1000 plates
14			Leaf	Mobile agents come to the village to collect from villagers	12/-kg
15			Seed	Villagers sell to purchasers at the local market	80/-kg
16	Satamuli	*Asparagus racemosus*	Root	Collected for domestic use only, is not sold	
17	Firewood		Leaves / Branches	Collected for domestic use only, is not sold	

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Kendua village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Kend	*Diospyros melanoxylon*	Leaf	Mobile agents come to the village to collect from villagers	45/- *Chata*
2	Mahua (*Mahul*)	*Madhuca indica*	Flower	Villagers sell to purchasers or mobile agents at the local market (*Hat*)	8/-kg
3			Fruit	Mobile agents come to the village to collect from villagers	10/-kg
4	Mushroom	*Agaricus bisporus*	Plant	Villagers sell to purchasers at the local market	8/-kg
5	Sal	*Shorea robusta*	Gum	Mobile agents come to the village to collect from villagers	60/- 1000 plates
6			Leaf	Mobile agents come to the village to collect from villagers	5/-kg
7			Seed	Collected for domestic use only, is not sold	
8	Firewood		Leaves / Branches	Collected for domestic use only, is not sold	

Data source: Based on questionnaire survey

Marketing channel and the price per unit of NTFP at Shushni village, Jamboni range, West Midnapur district

Sl No.	Plant from which NTFPs are collected	*Scientific name*	Parts of plant collected as NTFP	Product sold by	Price/Unit of products (Rs.)
1	Anantamul	*Hemidesmus indicus*	Root	Collected for domestic use only, is not sold	
2	Bhela	*Semecarpus anacardium*	Fruit	Collected for domestic use only, is not sold	
3	Kend	*Diospyros melanoxylon*	Leaf	Mobile agents come to the village to collect from villagers	12/- *Chata*
4	Mahua (*Mahul*)	*Madhuca indica*	Flower	Mobile agents come to the village to collect from villagers	10/-kg
5			Fruit	Collected for domestic use only, is not sold	
6	Mushroom	*Agaricus bisporus*	Plant	Mobile agents come to the village to collect from villagers	10/-kg
7	Piyal	*Buchanania lanzan*	Fruit	Mobile agents come to the village to collect from villagers	6/-kg
8	Sal	*Shorea robusta*	Gum	Mobile agents come to the village to collect from villagers	60/- 1000 plates
9			Leaf	Mobile agents come to the village to collect from villagers	5/-kg
10			Seed	Collected for domestic use only, is not sold	
11	Firewood		Leaves / Branches	Collected for domestic use only, is not sold	

Data source: Based on questionnaire survey

Appendix (4): Socio-physical features of Purulia, Bankura & West Midnapur districts

District: Purulia

Purulia district is the comprehensive part of the Chhotanagpur plateau. Earlier the area was identified as 'Maanbhum'. The word '*Maan*' has come from the 'Maan' dynasty, a branch of the Rastrakut Empire. The dynasty remained here between 400 to 600 AD. Before the British colonial period, several emperors ruled this area. Among them, Guptas were significant. (Arany-Pahare Purulia (1998) - the Government of West Bengal, soil conservation (South) Circle)

According to the Jain Bhagavati-Sutras of the 5th century AD, Purulia was one of the 16 *Mahajanapadas* (large communities), and was a part of the country known as Vajra Bhumi. However, little is known about Purulia before the British East India Company acquired the land through the *Diwani* of the *Subahs* of Bengal, Bihar and Orissa in 1765.

With the Regulation XVIII of 1805, a jungle Mahal district comprising 23 '*Parganas*' and '*Mahals*', Purulia was created. By Regulation XIII of 1833, the Jungle Mahal was divided into districts and a new district called Manbhum was formed, whose headquarters was at Manbazar. The district was large and included parts of Bankura and Bardhaman districts of the current state of West Bengal plus Dhanbad, Dhalbhum, Saraikela and Kharswan districts of the present Jharkhand and Orissa states. In 1838, the headquarters of Purulia district were transferred to its current position (http://purulia.gov.in/district_profile/dist_profile.html; cited on 4th May 2009).

In 1911 Maanbhum was removed from the Presidency of Bengal. However, the natives of the Maanbhum did not support this split up. Several movements were organized, that lasted until the independence (1947). On 1st November 1956 Maanbhum was re-united with the State of Bengal. Although the total area of 'Maanbhum' was divided into two parts - the west side is currently in Jharkhand and the eastern part is in Bengal. The eastern part of the Maanbhum has named as Purulia, one of the nineteen districts of West Bengal. Perhaps, the word 'Purulia' has come from the Dravidian word '*perulla*' or '*parul*'. The word '*Perullo*' means river and jungle and '*paru*' means rocks, whereas, '*la*' means in between. So the whole meaning of the word 'Purulia' is a land with rocks, rivers and jungle (Arany-Pahare Purulia (1998) - West Bengal Government, Soil Conservation (South) Circle).

Geographical location

Purulia district is located in the westernmost part of West Bengal. The district lies between 22° 60' N - 23° 50' N latitude and 85° 75' E - 86° 65' E longitudes. The total geographical area of the district is 6259 km². Therefore, the rural and urban areas are 79.37 km² (1.27%) and 6179.63 km² (98.73%), respectively. (Arany-Pahare Purulia (1998) - West Bengal Government, Soil Conservation (South) Circle)

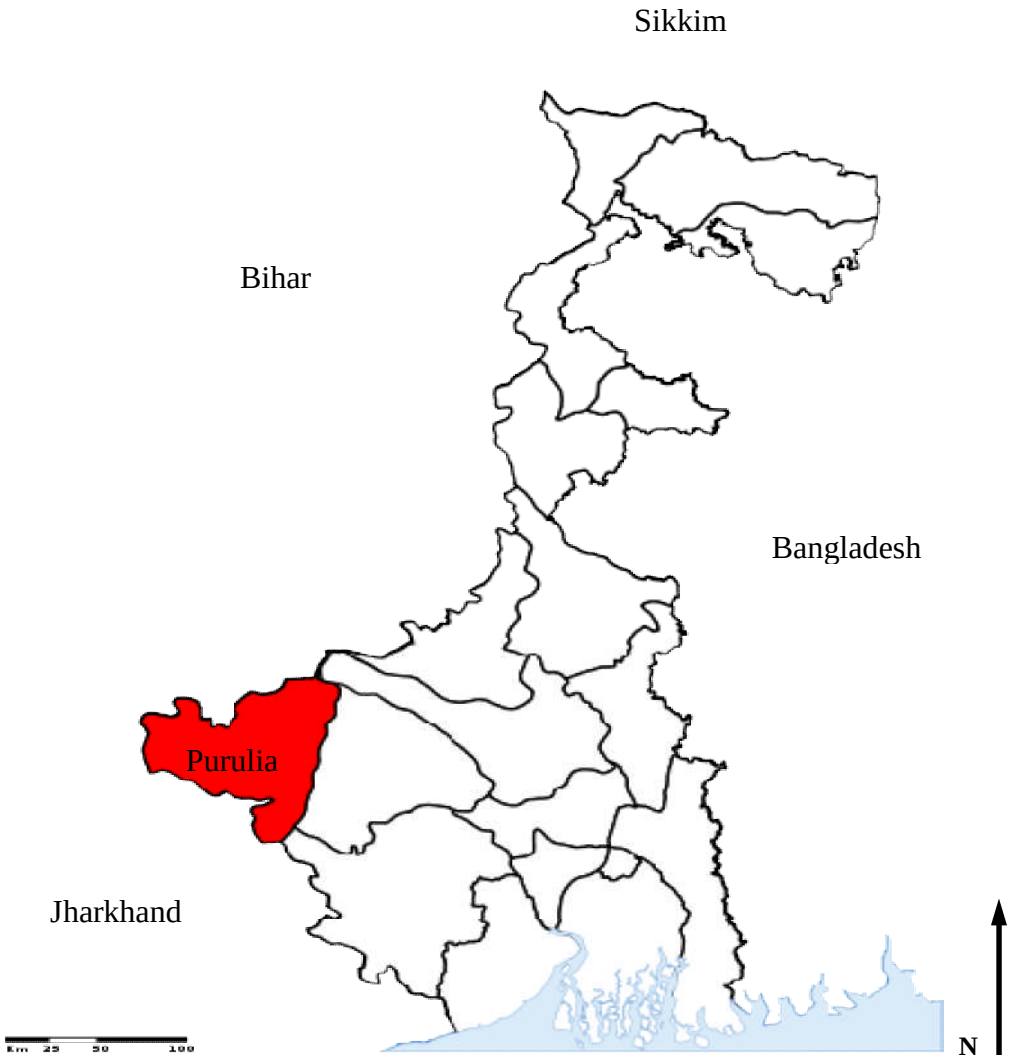


Fig. 1: The geographic location of Purulia district in West Bengal

Source: http://www.answers.com/topic/purulia-district-1 [Cited on 5th may 2009]

Subdivisions

The district consists of three subdivisions: Purulia Sadar East, Purulia Sadar West and Raghunathpur. Puruliya Sadar East is composed of Purulia town and seven blocks, while Puruliya Sadar-West consists of Jhalda municipality and seven other blocks. Raghunathpur subdivision consists of Raghunathpur municipality and six community development blocks.

Table 1: Administrative divisions of Purulia district

Subdivision	Blocks
Puruliya Sadar East	Manbazar–I, Manbazar–II, Bundwan, Purulia–I, Purulia–II, Hura and Puncha
Puruliya Sadar West	Jhalda–I, Jhalda–II, Jaipur, Arsha, Bagmundi, Balarampur and Barabazar
Raghunathpur	Para, Raghunathpur–I, Raghunathpur–II, Neturia, Santuri and Kashipur

Source: http://purulia.gov.in/ (Cited on 22nd May 2009)

Purulia town is the headquarters of the district. There are 20 police stations, 20 community development blocks, 3 municipalities, 170 gram panchayats and 2459 villages in the district.

Topography

Based on the topographical features the entire landmass of the district can be divided into six categories.

Table 2: Physiographic divisions of Purulia district

Sl No	Name of the class	Area (Sq. km.)
1	Gullied and Ravenous land	69.85
2	Land with or without scrub	498.32
3	Degraded notified forest land	172.34
4	Degraded pastures/grazing land	34.40
5	Barren Rocky Area	103.54
6	Steep Sloping Area	4.54
	Total Wastelands	883.39
	% to total Geo. Area	14.11

Source: http://purulia.gov.in/ (Cited on 24 May, 2009)

The overall physiographic characteristic of the district is undulating terrain with concentrations of woodland cover in hilly areas in the western and south-western parts of the district. Wide river valleys and cultivated lands on the plains are common in the eastern part of the district. The general slope of the district is from west to east. Among all four researched villages, only Buda is located within the forest covered hilly area, whereas, Kalaboni and Gurahata are on the plains – about 2-4 km away from the hilly -forest area. Gurahata is located at the foothill and within ½ km of the hilly-forest area. [Wasteland data as

per latest Landsat Thematic Mapper/IRS LISS II/III; http://purulia.gov.in/ (Cited on 06-05-2009)]

Geology

According to the geological characteristics the district can be divided into six different regions. These are –

1. Region of metamorphic rocks with an average altitude of 125 meters to 165 meters.
2. The coal mine areas of Damodar river valley with two major hills named Panchet and Biharinath.
3. The hilly area of Sushnia, Raghunathpur, and Sindur.
4. The plain land of the south-western part of the districts formed with metamorphic rock.
5. Regions of metamorphic pebbles, gravels and boulders and
6. The plateau area. (*Aranye-Pahare Purulia* (1998) – West Bengal Government, Soil Conservation (South) Circle)

Broadly the district can be divided into three geological regions. These are – the northern coal basin of the Gondwana period, crystalline rock bed and the volcanic rock belt of the Dharwar system is found in the south.

Climate

Monsoon in the south-west is the main source of rainfall in the district. The average annual rainfall varies from 1100 to 1500 mm.

Table 3: Average rainfall in Purulia district (mm)

Month	Last 50 years average rainfall	Average rainfall of 1972-1992	Average rainfall of 1992	Average rainfall of 1995	Days of rainfall	
					Average rainy days between 1972-1992	Average rainy days in 1992
January	18.90	11.59	9.63	28	3.80	1.28
February	28.50	18.53	31.03	21	3.78	2.11
March	18.30	17.96	-	27	2.98	-
April	24.10	23.68	25.31	1	4.75	3.00
May	61.30	62.27	78.51	57	6.01	7.69
June	218.80	213.32	189.09	168	16.38	10.23
July	345.60	291.53	233.03	292	21.34	16.15
August	333.60	301.80	274.34	384	19.67	17.16
September	203.60	227.94	263.30	463	13.60	8.00
October	85.30	89.73	28.83	100	5.68	2.58
November	15.80	11.14	8.5	143	1.04	2.00
December	3.4	9.41	10.45	17	1.12	1.00
Total	1375.20	1278.90	1153.37	1701.00	100.25	71.20

Source: Government of West Bengal, Soil Conservation (South) Division, 1998, p. 10

Relative humidity is high during the rainy season (75% to 85%), but drops in summer to less than 35%. The temperature varies over a wide range of 7° Celsius in winter to 46.8° Celsius in summer. There are three distinct seasons detected in the district. Summer from middle of March till middle of June, monsoon from mid June to end of September and winter is from November to February.

Table 4: Average monthly temperature in Purulia district (°C)

Month	1991		1992		1993		1994		1995	
	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	lowest
January	29	8	29	9	29	9	27	9	26	7
February	33	13	30	11	35	11	39	13	31	12
March	38	18	39	16	36	16	38	13	37	13
April	41	23	42	19	39	19	38	19	43	21
May	44	23	41	19	44	22	42	23	44	23
June	38	22	43	24	37	23	43	25	41	24
July	36	24	38	24	35	24	34	25	36	23
August	34	25	34	24	34	24	33	24	35	24
September	34	24	33	22	33	23	35	21	33	23
October	34	18	34	18	33	17	34	19	33	17
November	31	13	32	18	31	10	31	14	29	12
December	27	11	29	10	27	11	30	10	29	11
Annual highest/lowest	44	8	43	9	44	9	43	9	44	7

Source: Government of West Bengal, Soil Conservation (South) Division, 1998, p. 10

Soil

Due to the undulating topography, around 50% of the rainfall flows away as overflow. The district is mostly covered by residual soil formed by weathering of surface rocks. According to the structure of soil the district can be categorising into three main divisions – a) residual type soils arising from weathering of granites, gneisses and schist; b) lateritic soils of the hilly areas and c) clay loam to clay soil of river valleys. The soil is mostly acidic with pH value of more than 5.5. Due to the very limited presence of organic substances, the soil is not very fertile, so a much uncultivated wasteland is found in the district. Around 165,200 hectares of the total landmass suffers from soil erosion, of which, 135000 hectare is in non-forest areas and 30200 hectares is woodland. [http://purulia.gov.in/ (Cited on 06-05-2009)]

Rivers

The most important rivers flowing through the district are Kangsabati, Kumari, Dwarakeswar, Subarnarekha and Damodar. Damodar River flows through the northern part of the district, whereas, Subarnarekha catchment is found at the south-western part. Due to the typical undulated topographic features in the district, around 50% of the rain flows as runoff. Rupnarayan (Kangsabati / Kansai) – the main river of the district is coming from the Chhotanagpur plateau area and flows from north-west to south-east. The river known as

Dhaleswari in the Chhotanagpur plateau area, is known in Bankura as Dwarkeswar and in West Midnapur as Rupnarayan. Finally, it joins with the Hooghly River flowing 150-mile (240 km) from its source. The river has an important role regarding irrigation in the district. [NIC Purulia District Centre Website: http://purulia.gov.in/ (Cited on 06-05-2009)]

Forestry

The forest of Purulia district consists of Sal and various other species. In some forests, Sal is the most important species and different other plant species can be found associated with it, while in other forests miscellaneous types of species have developed independently. Other important species are Mahua, Piyal, Kend, Bel, Kalmegh, Bhela etc. The natural forest of Purulia district can be divided into two broad categories – a) Sal forests and b) Miscellaneous forests.

The total forest area in Purulia district is 876 km² including 112 km² of Reserved Forest, 729 km² of protected forest and 35 km² of unclassed state forest. About 14% of the total geographical area of the district is under forest cover (State Forest Report 2004-05). There are three forest divisions in the district. These are – a) Kangsabati – 1, b) Kangsabati – 2 and c) Purulia.

Table 5: Forest divisions and ranges in Purulia district (2007-08)

Sl No.	Name of division	Name of range	Total forest area (Hectare)
1	Purulia	Balarampur	6438.79
		Matha	4259.75
		Bagmundi	14244.52
		Ajodhya	13719.76
		Jhalda	7841.65
		Kotshila	4614.47
		Joypur	2649.49
		Arsha	7927.81
		Subtotal	61696.022
2	Kangsabati 1	Purulia 1 & 2 – Para, Raghunathpur, Kashipur, Puncha, Hura	27686.844
3	Kangsabati 2	Manbazar 1 & 2, Bandwan 1 & 2, Jamuna, Barabazar	25939.08
District Total			115321.946

Source: Annual Forest Report 2007-08, Purulia Forest Division, Purulia

The following table (Table 6) shows how the different types of forest covers of Purulia district have been changed in the last two decades. Sometimes the dense forest covers have turned into moderately dense or open forests. The total amount of open forest covers has fluctuated considerable from one year to another.

Table 6: The nature of forest covers in Purulia district (1991 – 2005 area in ²Km)					
Year	Geographic area	Very dense	Moderately dense	Open forest	Total forest
1991	6259	194	-	382	576
1993	6259	183	-	400	583
1995	6259	183	-	415	598
1999	6259	174	-	433	607
2001	6259	328	7	367	695
2003	6259	34	234	496	764
2005	6259	181	-	426	607
Source: State Forest Reports 1995, Forest Survey of India					

Agriculture

Monocropping (normally rice and wheat) is mainly practiced in this district. Approximately 60% of the total cultivated land is hilly area. Of the total agricultural land about 73% belongs to the small and marginal farmers with scattered and fragmented smallholding. The principal crop of the district is Paddy. Half of the total landmass is 'net-cropped' area, while 17% of it is used for multi-cropping. About 77% of the net cultivated area is used for *Aman* (monsoon) cultivation. Because of the dry climatic condition and poor irrigation system, agricultural activities mainly occur during monsoon [NIC Purulia District Centre Website: http://purulia.gov.in/ (Cited on 06-05-2009)].

Mineral Resources

Although different types of mineral resources are available in the district it is still considered to be one of the most un-developed districts of West Bengal in the context of industrial development. At least ten different kinds of minerals are obtainable in the district. The most important are coal, limestone, rock phosphate, kaolin, quartz, etc.

Coal is the most important among them. Total amount of coal deposition in the district is no less than 450 million tonnes. Purulia district has two major Collieries - one is at Ranipur and the other one at Parbelia. Other important minerals hitherto explored and reported are apatite or rock phosphate at Beldi; limestone from Jhalda, Jabangram, maramum, Belamin; China clay from Dhatare, Mahatamare, Katajhar; Fire clay of Malti; Quartz from Mirmi etc [NIC Purulia District Centre Website: http://purulia.gov.in/ (Cited on 06-05-2009)].

Demography characteristics

The district has a population of 2,536,516 of which 1,298,078 male and 1,238,438 female (Sex ratio is 954 per 1000 male). The percentage of Scheduled Caste (SC) and Scheduled Tribes (ST) are 18.29 % and 18.27% respectively. The literacy rates of male and female are

73.72 % and 36.50 % of the total population respectively. Of the total population 89.93% live in rural areas and 10.07% in urban areas only.

Of the total population about 83.42% are Hindu, 7.12% Muslims and 8.95% others. Among tribal communities Santal, Bhumij and Kora are numerically the most important, whereas, Bauri, Sunri and Rajwar are the major Scheduled Caste communities in the district (According to the Census 2001).

Table 7: Demographic features of Purulia district (Census 2001)

	1991 Census	%	2001 Census	%
Total population	2224577		2536516	
Male opulation	1142771	51.37	1298078	51.18
Female population	1081806	48.63	1238438	48.82
Rural population	2014571	90.56	2281090	89.93
Urban population	210006	9.44	255426	10.07
Scheduled caste	430513	19.35	463956	18.29
Scheduled tribe	427765	19.23	463452	18.27
Sex ratio	947	-	954	-
Population density (per sq. km.)	355	-	405	-
Decadal growth rate	20.00 (1981-91)		14.02 (19991-2001)	

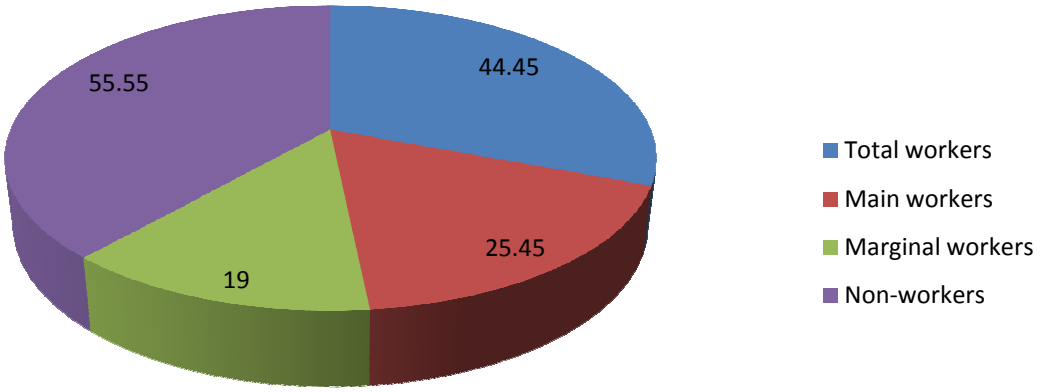
Source: http://purulia.gov.in/ (cited 29th April, 2009)

Occupational characteristics

Purulia is one of the most economically backward districts in West Bengal. The limited agricultural activities and lack of major industrial units are the central reasons for this. The Santaldih Thermal Power Station and a cement factory are the only major industrial setup of the district. Besides this, a big project of iron-steel has been started at Raghunathpur. At Jhalda, Purulia and some other places a few medium scale industries are found. There are a good number of small-scale or cottage industries in the district. Purulia is famous for Lac cultivation. Presently the Lac industry has been enhanced with the help of government as well as non-governmental organisations.

A large proportion of the district population also works as agricultural wage labourers within the district or in neighbouring districts at least twice in a year. Casual wage labourer is another option for poor rural people. A good number of people in this district are directly or indirectly dependent on forest products. Firewood business is a good profession for forest fringe dwellers. Apart from that several types of NTFPs are harvested for livelihood purposes. People working as government employees are concentrated in the town areas and at the district headquarters; however, the percentage is low compared to total population of the district.

Graph 1: Percentage of total worker, main worker, marginal worker and non-worker population to total population of Purulia district (based on 2001 Census data)



Arsha Block

Geographic location

The research area of this district is located in the Arsha block of Purulia Sadar mahakuma. Arsha block is located between 23° 14' N - 23° 18' N latitude and 86° 09' E - 86° 13' E longitude. The total area of this block is 159 km² including 8 gram panchayats. During the period of fieldwork four villages were studied. These are Bhuda (23° 14' N and 86° 10' E), Sirkabad (23° 16' N and 86° 11' E), Kalaboni (23° 16' N and 86° 11' E) and Gurahata (23° 16' N and 86° 12' E).

Table 8: Geographic area of each researched village

Sl. No.	Name of the village	Jl. No.	Police station	*Mauja* area (in hectare)
1	Kalaboni	29	Arsha	44.50
2	Gurahata	67	Arsha	883.26
3	Sirkabad	68	Arsha	791.05
4	Bhuda	69	Arsha	1387.40

Source: Arsha Forest Range Office, 2008

Administration

Arsha is an intermediate block in Purulia district, with total of 8 Gram Panchayats including Arsha, Beldih, Chatuhansa, Hensla, Hetgugui, Mankiary, Puara and Sirkabad village panchayats. The Police Station and Forest Range office of the block is at Arsha but the Block Developmental Office is at Sirkabad.

Physiographic features

Arsha block is the lowest step of the Chhotanagpur Plateau. In general, the topography is undulating with scattered hills and ranges from a height of 150 m to 350 m above the mean sea level. Bhuda village is located at about 311 meters altitude, in the middle Ajodhya Hill. Other villages are located within 5 km of the hill forest between altitudes of 283 meters to 296 meters. Hills are covered with woodland while the density of woodlands varies place to place. At the foothill areas farmlands are found. Some arable land are also seen within the forests.

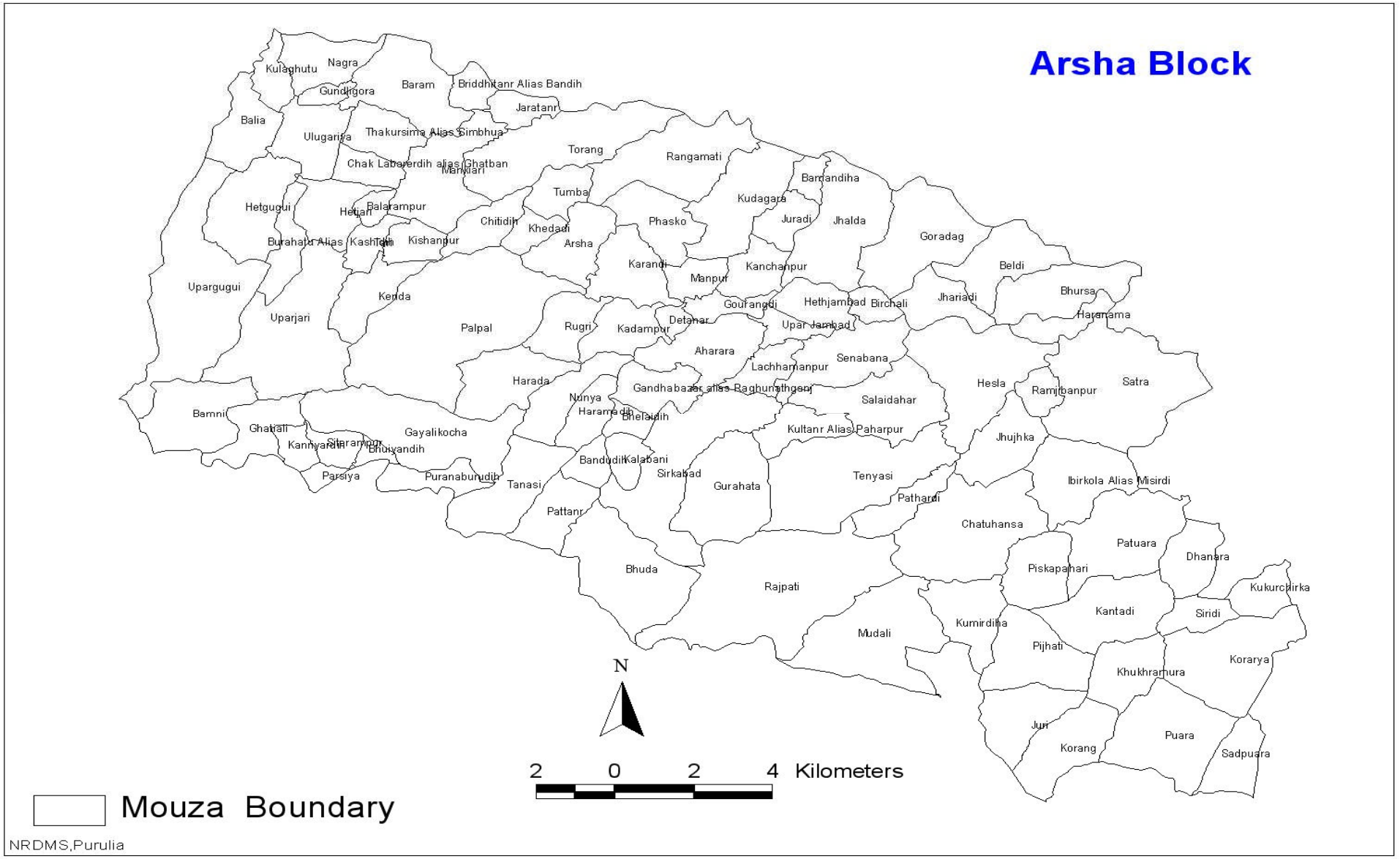


Fig. 2: Arsha block with *Mouza* boundaries

Source: NRDMS, Purulia

Climate

In Arsha block, the average annual rainfall is 1200 mm. Very dry winters and modest humid summers are common in this block. The climate of the region is very strongly influenced by the presence of Ajodhya hill. Although the rocky hills are covered with forests (though the density of forest varies from place to place), during the summer warm winds come from the hill areas leading to an increase of temperature in Arsha block. On the other hand, during winter, the rocky hill area remains much cooler compared to the surrounding areas which reduce the temperature of the foothill areas. In summer, the temperature is as high as 46 °C, whereas in winter it drops to 8 °C. Thus, extreme weather conditions can be found in the block.

Soil

Different types of soil are found all over the block. Due to weathering by wind and surface flow, eroded materials are very common in the plains, which come from the highland areas. Alluvium soil is common along the river valleys. Clay and clay-loams soil are also observed on the plains. Normally, lateritic soil is found in the upland areas, whereas, in the valley area the soil is clay loam of white or reddish colour. Because of the acidic nature of the soil, quality is poor in general, which is a major hindrance to agricultural activities in the Block.

Rivers

A few small river channels are found in the block. They are identified with local names. Kasai *Nadi* (river), Bandhu *Nadi* (river), Burudih *Nadi* (river) are well-known among them. Kasai *Nadi* (river) is the most important. Most of these channels are tributaries or distributaries of Kangsabati River. They are mainly coming from the Ajodhya hill area and flowing from west to east.

Forestry

In Arsha block mainly miscellaneous forests are found, where there is no dominant species. The main species present in the area are Sal, Piyal, Kend, Mahua, Bhela, Karanj, Kusum, Kalmegh, Bel, Kurchi, Gethi-Alu, Kanchan, Amla, Anantamu, Iswarimul etc.

Most of the forest is in hilly areas although a few patches of woodlands are also found on the plains. Forests are mainly Protected and Unclassed State types. Very little reserved forest is in this range area. Planted forests are also seen in some places. There are three Forest Beats in Arsha Range. Fieldwork was conducted at Sirkabad Beat because part of its forest

is on a hilly area and the rest of the area is on the plains. The number of forest-dependent tribal people is also highest in this area.

Table 9: Forest area in each Beat of Arsha range		
Sl. No.	Beat	Area (Hectare)
1	Arsha	4211.46
2	Sirkabad	3266.33
3	Kantadih	1438.81
Total Arsha Range		8916.60
Source: Arsha Forest Range Office, Arsha, Purulia, 2008		

Agriculture

Agricultural activities are mainly dependent on monsoon rainfall. Because of the poor irrigation system, little agriculture takes place outside the monsoon season. The main cultivated crops are paddy, wheat, sugarcane, mustard, potatoes are other agricultural products.

Mineral Resources & industrial activities

Due to the absence of any mining area in the block there is no major industry. Small-scale and cottage-based artisan oriented industrial (ironsmith, mat-making, pottery etc) activities are found in some places.

Demographic features

In the 2001 census, Arsa community development block had a population of 129,088 of which 65935 were males and 63153 were females. [http://www.answers.com/topic/arsa-1 (cited on 06-05-2009)]

Table 10: Demographic features of Arsha block (Census 2001)				
Demographic features	Total	Male	Female	%
Population	129088	65935	63153	-
Sex ratio	957.81	-	-	-
Child population (Age group 0-6)	22048	11186	10862	-
Rural population	129088	65935	63153	-
Urban population	-	-	-	-
Scheduled caste	15258	-	-	-
Scheduled tribe	29594	-	-	-
General	84236	-	-	-
Number of literates	50310	-	-	-
Population density (per sq. km.)	-	-	-	-
Total household	22421	-	-	-
Concrete (*Pucca*) house	641	-	-	11
Mud (*Kuchha*) house	5195	-	-	89
Area (In hectare)	40337.44 (159 km²)	-	-	-
Birth rate	-	-	-	1.58
Death rate	-	-	-	0.42
Main workers	35185	26063	9122	-
Marginal workers	29751	9653	20098	-
Non-workers	64152	30219	33933	-
Cultivators	22383	15338	7045	-
Agricultural labourers	23949	9739	14210	-
Household-industry workers	7703	2921	4782	-
Other workers	10901	7718	3183	-
Source: Block Development Office, Arsha, Purulia				

Sirkabad

The research was conducted at Sirkabad gram panchayat (village council) of Arsha block. Sirkabad village is about 12 km away from Arsha. The gram panchayat has been selected for research because of three main reasons. These are –

a) Hilly as well as plain land open dry-deciduous forest areas are available here.
b) The Gram Panchayat is dominated by Scheduled Caste and Scheduled Tribe villagers.
c) Forest products are collected for livelihood purposes.

Table 11: Demographic features of Sirkabad Gram Panchayat (Census 2001)

	Total	Male	Female
Population	21326	10862	10464
Scheduled caste	3570	1827	1743
Scheduled tribe	6295	3192	3103
Sex ratio		-	-
Child population (Age group 0-6)	3596	-	-
Number of households	3659	-	-
Area (In hectare)	5750.65	-	-
Number of literates	8679	6211	2468
Main workers	5571	-	-
Marginal workers	4242	-	-
Non-workers	11590	-	-
Cultivators	3116	-	-
Agricultural labourers	3726	-	-
Household-industry workers	247	-	-
Other workers	2410	-	-

Source: Block Development Office, Arsha, Purulia

From the above table (Table: 10) we can obtain an idea of the demographic features of this Panchayat area. About 46.26 % of the total population of this Panchayat are of backward class, including 29.52 % of Scheduled Tribe.

Table 12: Demographic features of Sirkabad village (Census 2001)

Demographic features	Total	Male	Female
Population	5236	2693	2543
Scheduled caste	1867	950	917
Scheduled tribe	450	231	219
Sex ratio	-	-	-
Child population (Age group 0-6)	767	-	-
Number of literates	2638	1761	877
Main workers	1503	-	-
Marginal workers	353	-	-
Non-workers	3369	-	-
Cultivators	304	-	-
Agricultural labourers	868	-	-
Household-industry workers	16	-	-
Other workers	668	-	-

Source: Block Development Office, Arsha, Purulia

In Sirkabad village about 44.25 % of population are from Other Backward Classes. Most of the working people of this village work as agricultural wage labourer. Other important professions are the collection of forest products, cultivation, household industry etc.

Table 13: Demographic features of Sirkabad village (Economic Survey Report 2005)

Demographic features	Total	Male	Female
Population	5236	2693	2543
Scheduled caste	1867	950	917
Scheduled tribe	450	231	219
Sex ratio	-	-	-
Child population (Age group 0-6)	787	406	381
Number of literates	2579	1720	859
Number of illiterates	2657	973	1684
Number of households	986	-	-
Working people	1860	1365	495
Main workers	1506	1179	327
Marginal workers	354	186	168
Non-workers	3376	1328	2048
Cultivators	311	289	22
Agricultural labourers	867	473	394
Household-industry workers	19	9	10
Other workers	663	594	69

Source: Block Development Office, Arsha, Purulia

According to the Economic Survey Report of 2005 the demographic features of Sirkabad village have not changed very much from the Census Report of 2001.

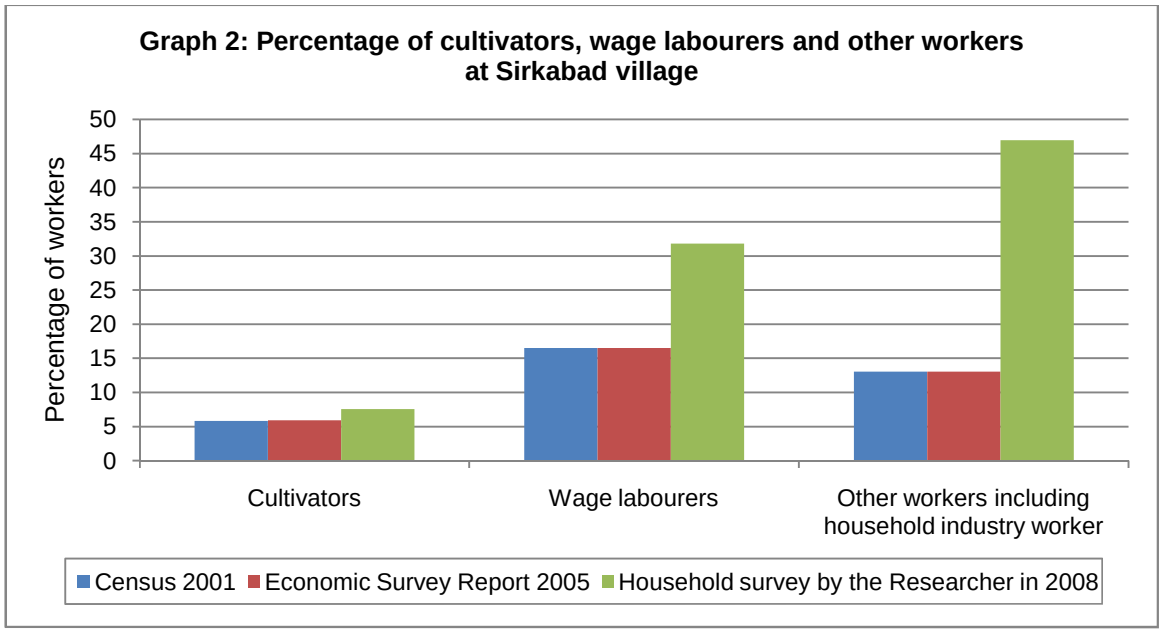
Table 14: Household survey at Sirkabad village in 2008

	Total	Male	Female
Number of households surveyed	15	-	-
Household population	66	28	38
Scheduled caste	29	14	15
Scheduled tribe	34	13	21
Other communities	3	1	2
Child population (Age group 0-6)	23	-	-
Number of literates	10	-	-
Number of illiterates	56	-	-
Cultivators	5	-	-
Wage labourers	21	-	-
Other workers including NTFPs collectors	31	-	-

Source: Based on questionnaire survey

During household survey, men, women as well as children were encouraged to contribute their opinion regarding NTFPs harvesting and their livelihoods with forestry. The percentage of people from Other Backward Class is quite noticeable in the village. The literacy rate is rather low in the community. Very few people are working in formal sectors such as government service. From the household survey, it is fairly clear that the number of cultivators is very low compared to [agricultural] wage labourers and other workers including

forest products collectors. People work as agricultural wage labourers during the cultivation period also go for forest product collection when they do not get any other job.



Bhuda

All the villagers in Bhuda are scheduled tribes. The village is located in the Ajodhya hill area and covered with dense forests. It is about 5km away from the Sirkabad local market. According to census data the percentage of cultivators was 8.53%, whereas, the percentage of wage labourers and other workers were 34.11% and 57.36% respectively.

Table 15: Demographic features of Bhuda village (Census 2001)

Demographic features	Total	Male	Female	%
Population	289	146	143	-
Scheduled caste	-	-	-	-
Scheduled tribe	289	146	143	-
Sex ratio	-	-	-	-
Child population (Age group 0-6)	47	28	19	-
Number of literates	128	86	42	44
Main workers	68	54	14	-
Marginal workers	61	12	49	-
Non-workers	160	80	80	-
Cultivators	11	11	-	-
Agricultural labourers	44	32	12	-
Household-industry workers	-	-	-	-
Other workers	74	23	51	-

Source: Census data 2001

There were no household industry workers at the village. Among the other workers a good number of people depend on forest product harvesting. The total population of Bhuda village during the Economic Survey of 2005 was same as it was in 2001.

Table 16: Demographic features of Bhuda village (Economic Survey Report 2005)

Demographic features	Total	Male	Female
Population	289	146	143
Scheduled caste	-	-	-
Scheduled tribe	289	146	143
Sex ratio	-	-	-
Child population (Age group 0-6)	48	28	20
Number of literates	126	83	43
Number of illiterates	163	63	100
Number of households	58	-	-
Working people	129	66	63
Main workers	68	54	14
Marginal workers	61	12	49
Non-workers	160	80	80
Cultivators	8	8	-
Agricultural labourers	44	33	11
Household-industry workers	-	-	-
Other workers	77	25	52

Source: Block Development Office, Arsha, Purulia

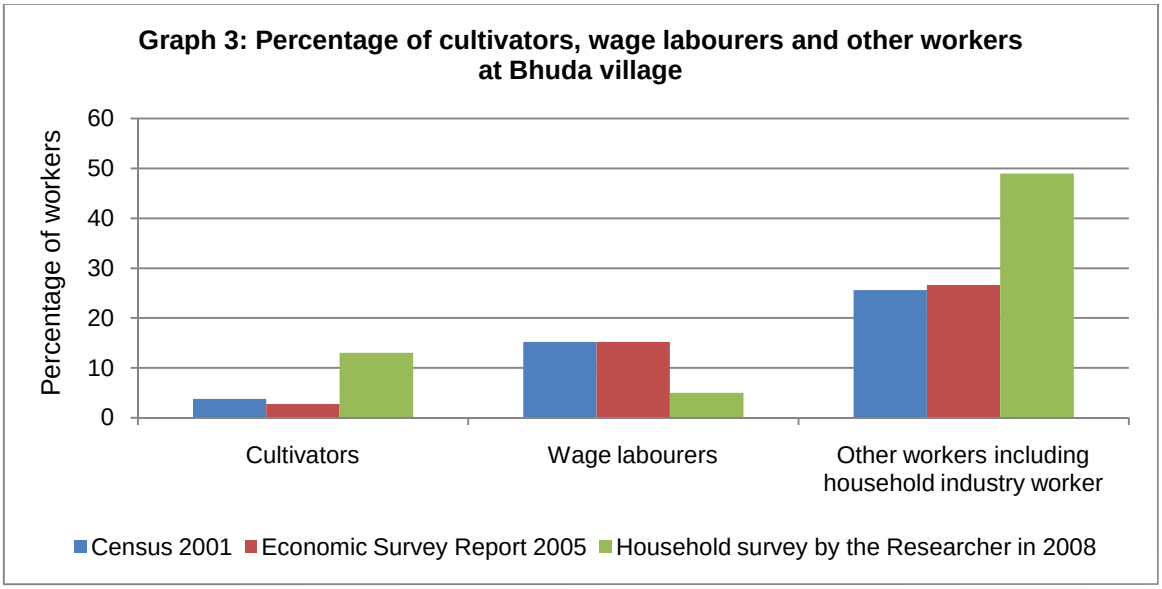
Although, the number of cultivators has reduced, the number of other workers has increased. The number of agricultural wage labourers was same as it was in 2001.

In 2008, the researcher conducted a household survey among 15 households of the village, comprising 100 villagers. There are some cultivated lands within the forest area. The villagers produce crops, mainly paddy, there. Here the percentage of cultivators is greater than Sirkabad and Gurahata. A few of the villagers are engaged in dairy farming. They feed their cattle in forest areas.

Table 17: Household survey at Bhuda village in 2008

	Total	Male	Female
Number of households surveyed	15	-	-
Household population	100	52	48
Scheduled caste	-	-	-
Scheduled tribe	100	52	48
Other communities	-	-	-
Child population (Age group 0-6)	25	-	-
Number of literates	34	-	-
Number of illiterates	66	-	-
Cultivators	13	-	-
Wage labourers	5	-	-
Other workers including NTFPs collectors & Dairy farmers	49	-	-

Source: Based on questionnaire survey



Kalaboni

Kalaboni, a purely tribal village, is about 3 km away from the forest area and the distance from the Sirkabad local market is also the same. Quite a few people of this village have their own cultivated land. The total population of the 2001 Census data and 2005 Economic Survey data was the same. However, the total number of cultivators had reduced in 2005 compared to the Census data of 2001, whereas, the number of wage labourers has increased.

Table 18: Demographic features of Kalaboni village (Census 2001)

Demographic features	Total	Male	Female	%
Population	743	385	358	-
Scheduled caste	-	-	-	-
Scheduled tribe	734	382	352	-
Sex ratio	-	-	-	-
Child population (Age group 0-6)	158	82	76	-
Number of literates	288	208	80	38
Main workers	234	188	46	-
Marginal workers	229	37	192	-
Non-workers	280	161	119	-
Cultivators	99	96	3	-
Agricultural labourers	278	90	188	-
Household-industry workers	1	1	-	-
Other workers	85	38	47	-

Source: Block Development Office, Arsha, Purulia

Firewood is the main forest product collected by the villagers. Except during the cultivation period, the rest of the year, at least one person from each household collects firewood from the nearest forest area. Apart from firewood, villagers also make Sal plates for sale. The total number of collected NTFPs is low here.

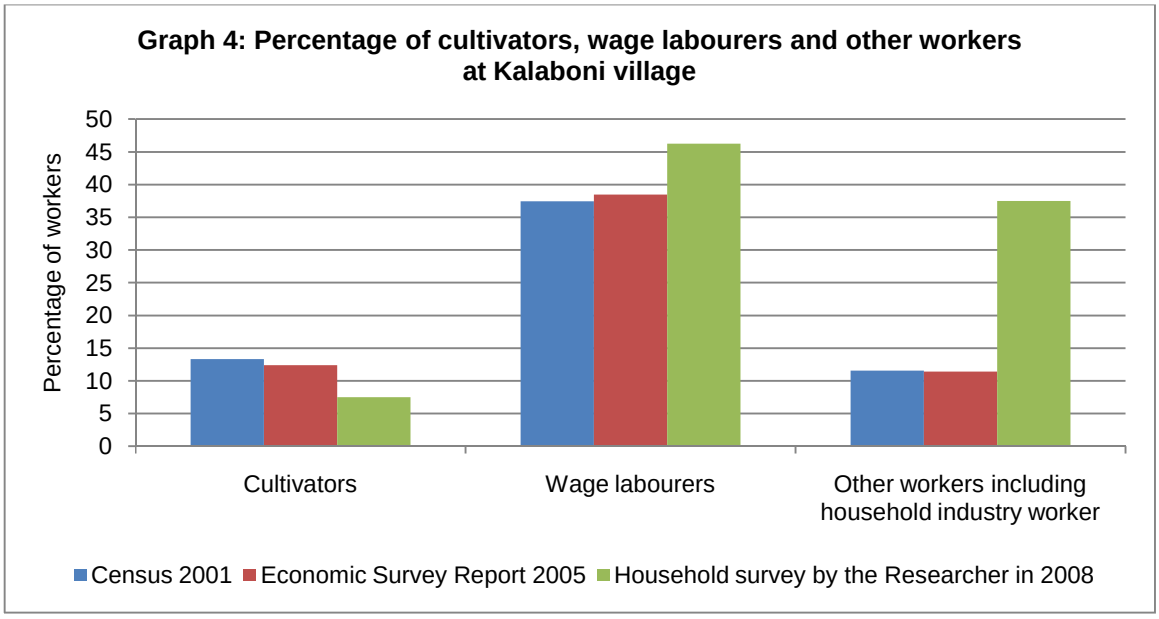
Table 19: Demographic features of Kalaboni village (Economic Survey Report 2005)

Demographic features	Total	Male	Female
Population	743	385	358
Scheduled caste	-	-	-
Scheduled tribe	734	382	352
Sex ratio	-	-	-
Child population (Age group 0-6)	161	83	78
Number of literates	260	192	68
Number of illiterates	483	193	290
Number of households	130	-	-
Working people	463	224	239
Main workers	233	186	47
Marginal workers	230	38	192
Non-workers	280	161	119
Cultivators	92	89	3
Agricultural labourers	286	97	189
Household-industry workers	2	2	-
Other workers	83	36	47

Source: Block Development Office, Arsha, Purulia

About 15 households have been surveyed here during the period of fieldwork. The percentage of literacy rate is very poor here compared to other villages. Surprisingly, the researcher met very few cultivators compared to wage labourers and other workers.

Table 20: Household survey at Kalaboni village in 2008			
	Total	Male	Female
Number of households surveyed	15		
Household population	80	42	38
Scheduled caste	-	-	-
Scheduled tribe	80	42	38
Other communities	-	-	-
Child population (Age group 0-6)	13		
Number of literates	9		
Number of illiterates	71		
Cultivators	6		
Wage labourers	37		
Other workers including NTFPs collectors	30		
Source: Based on questionnaire survey			



Gurahata

The last village in the block that the researcher visited was Gurahata. The village is about half kilometer away from the hilly forest area and about 2 km away from the Sirkabad local market. The number of cultivators is low compared to daily wage labourers. There are no household industry workers in the village. A large number of daily wage labourers, when they do not get any other job, go to the forest to collect forest products, particularly firewood.

Table 21: Demographic features of Gurahata village (Census 2001)

Demographic features	Total	Male	Female	%
Population	594	295	299	-
Scheduled caste	-	-	-	-
Scheduled tribe	471	229	242	-
Sex ratio	-	-	-	-
Child population (Age group 0-6)	119	58	61	-
Number of literates	260	182	78	43
Main workers	13	10	3	-
Marginal workers	248	127	121	-
Non-workers	333	160	173	-
Cultivators	2	2	-	-
Agricultural labourers	251	129	122	-
Household-industry workers	-	-	-	-
Other workers	8	6	2	-

Source: Block Development Office, Arsha, Purulia

The Economic Report of 2005 of the village was the same as the 2001 Census data. Surprisingly, the number of literate people has fallen during this period.

Table 22: Demographic features of Gurahata village (Economic Survey Report 2005)

Demographic features	Total	Male	Female
Population	594	295	299
Scheduled caste	-	-	-
Scheduled tribe	471	229	242
Sex ratio	-	-	-
Child population (Age group 0-6)	121	59	62
Number of literates	245	175	70
Number of illiterates	349	120	229
Number of households	112	-	-
Working people	260	136	124
Main workers	11	9	2
Marginal workers	249	127	122
Non-workers	334	159	175
Cultivators	1	1	-
Agricultural labourers	250	128	122
Household-industry workers	-	-	-
Other workers	9	7	2

Source: Block Development Office, Arsha, Purulia

The researcher surveyed 15 households in the village. The majority of the population are Scheduled Tribes. The researcher met a few cultivators, who have their own cultivated land. The number of other workers was compared to the number of daily wage labourers.

Table 23: Household survey at Gurahata village in 2008			
	Total	Male	Female
Number of households surveyed	15	-	-
Household population	70	34	36
Scheduled caste	-	-	-
Scheduled tribe	62	29	33
Other communities	8	5	3
Child population (Age group 0-6)	16	-	-
Number of literates	14	-	-
Number of illiterates	56	-	-
Cultivators	5	-	-
Wage labourers	23	-	-
Other workers including NTFPs collectors	30	-	-
Source: Based on questionnaire survey			

District: Bankura

In the Mahabharata, Bankura has been described as '*Suhmobhumi'*. The word '*Larh'* or '*Rarh'* was initiated after the 6th century AD. In Santhali language '*lar'* denotes thread, '*rarh'* indicates tune and '*larh'* stands for snake. Possibly the Jain and Greek scholars used this Austric word '*Larh'* to describe this dry forest region which had been very difficult to access at that time [http://www.bankura.org/site/History.htm].

Geographical location

The district Bankura is located in the western part of West Bengal. The district is enclosed by $22^0$38' N to $23^0$38' N latitude and $86^0$36' E to $87^0$47' E longitude. The bordering districts are Bardhaman in the north, Purulia in the west and Paschim (West) Midnapur in the south.

Subdivisions

The district comprises three subdivisions: Bankura Sadar, Khatra and Bishnupur. The Bankura Sadar subdivision consists of Bankura municipality and eight community development blocks. The Khatra subdivision consists of eight community development blocks, whereas, Bishnupur subdivision consists of Bishnupur and Sonamukhi municipality, and six community development blocks. The fieldwork for this research was conducted in Ranibandh block of Khatra subdivision.

Table 1: Subdivisions, municipalities and blocks of Bankura district

Subdivisions	Municipality	Community development blocks
Bankura Sadar subdivision	Bankura	Bankura — I, Bankura — II, Barjora, Chhatna, Gangajalghati, Mejia, Onda and Shaltora
Khatra subdivision		Indpur, Khatra, Hirbandh, Raipur, Sarenga, Ranibandh, Simlapal and Taldangra
Bishnupur subdivision	Bishnupur and Sonamukhi	Indas, Joypur, Patrasayar, Kotulpur, Sonamukhi and Bishnupur

Source: District Human Development Report Bankura, 2007

The district headquarter is in Bankura town. In Bankura district, there are 21 police stations, 22 development blocks, 3 municipalities, 190 Gram Panchayat and 5187 villages.

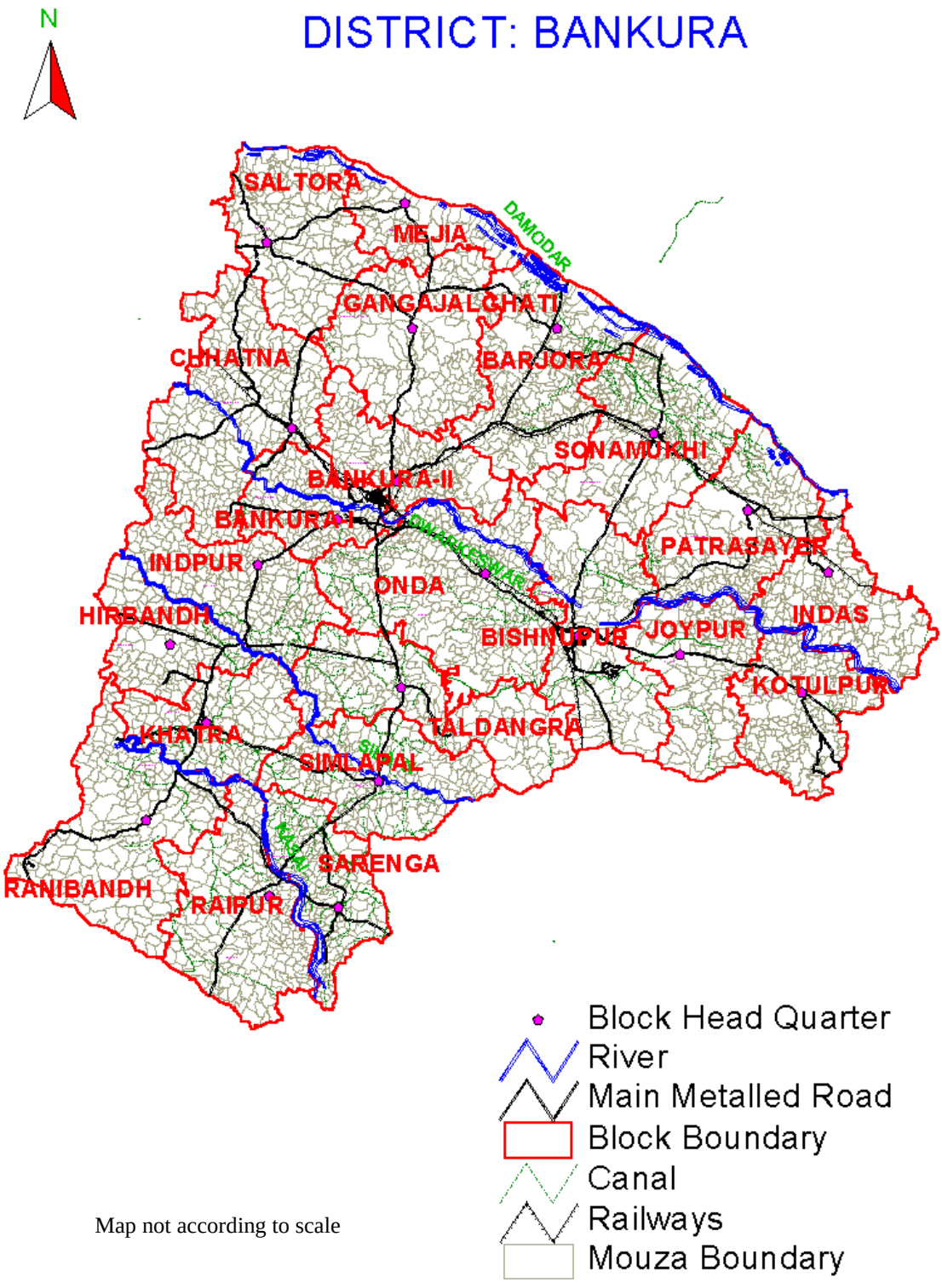


Fig 1: Administrative divisions of Bankura district

Source: NRDMS, Bankura

Topography

The district is largely divided into three physiographic provinces, the flood plains to the east, undulating track in the middle and the hilly areas of the west. The entire subdivision of Bishnupur and some of the eastern Blocks of Bankura subdivision are on the plain. Along the middle of the district the height of the land surface increases gradually and becomes more prominent towards the west. The land along the western border of the district consists of lateritic ridges covered with woodlands.

Geology

The geology of this region has been analysed by the Geographical Survey of India (GSI), while the State Directorate and others have done the geological mapping in some other parts of the district. Most of the district is made up of rolling laterite and alluvium. To the east there is a large recent alluvial plain, while schists and gneisses of Archean age are found in the west, which forms the eastern boundary of the Chhotanagpur plateau area. Sedimentary rocks of Gondwana system formed the southern part of the Raniganj Basin.

Climate

The seasons in Bankura district are divided as hot summer (April-May), monsoon (June to September) and cool winter (November-February). The climatic features of the District are quite same as of other two researched Districts. The humidity is generally moderate to high throughout the year and the rainfall is normally well distributed. Average annual rainfall in the district is roughly 1300 mm. The rainy season starts in June and continues until September.

Table 2: The average monthly rainfall in Bankura district

Month	Rainfall (mm)
January	14.9
February	24.5
March	25.4
April	36.4
May	63.2
June	212.7
July	317.8
August	316.3
September	180.9
October	89.1
November	17.8
December	3.1

Source: Second Working Plan of Bankura Forest Divisions, 1997-98 – 2015-16, p. 21

Table 3: 20 years average of annual and monthly distribution of rainfall in Bankura district			
Month	No of rainy days	Amount of rainfall (mm)	% of the total rainfall in the year
January	0.98	9.48	0.74
February	1.35	14.86	1.16
March	1.80	23.98	1.87
April	2.65	44.71	3.49
May	4.65	68.38	5.33
June	10.45	206.38	16.54
July	16.50	289.12	22.18
August	15.00	252.40	12.74
September	11.80	234.42	18.36
October	6.10	117.60	9.20
November	1.05	16.25	1.27
December	3.00	1.56	0.12
Source: Second Working Plan of Bankura Forest Divisions, 1997-98 – 2015-16, p. 21			

Soil

There are three major categories of soil are found in Bankura district: (1) red soil, (2) alluvial soil and (3) laterite soil. Typical red soil is found in southern parts of the district, predominantly in Bishnupur, Raipur and Kotulpur block area.

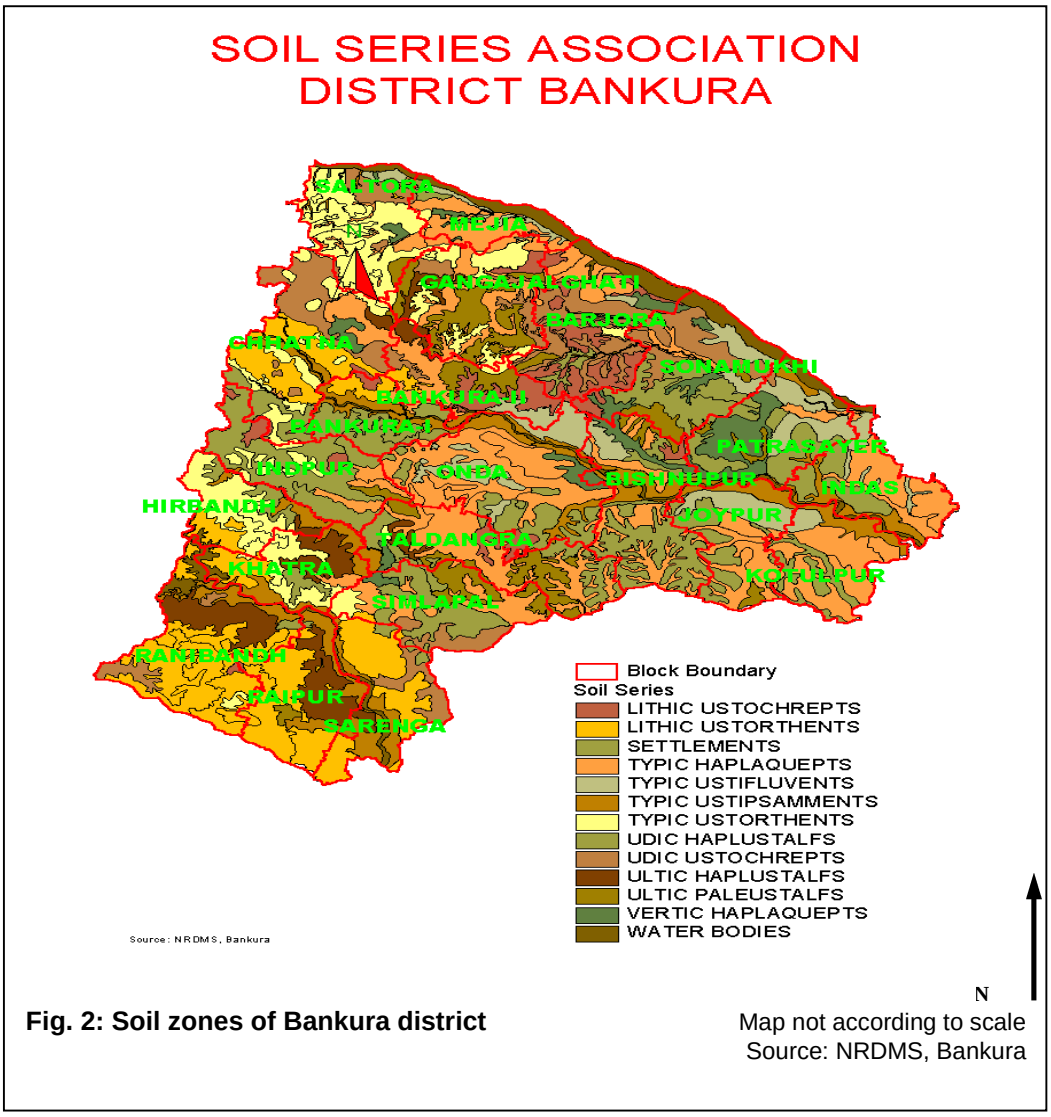


Fig. 2: Soil zones of Bankura district

Map not according to scale
Source: NRDMS, Bankura

The red soil, which is shaped from metamorphic parent material and found mainly in lateritic zones, supports Sal plantation. The alluvial soil is widely distributed in central-eastern and south-east parts of the district. The laterite soil is found in south-central and south-eastern parts of the district. This can be differentiated from the red soils by its composition.

Based on the soil textural the district soil can be classified into six categories. These are – 1) sandy soil, 2) sandy loam soil, 3) sandy clay loam, 4) loam, 5) clay loam and 6) clay. Clay, clay dominated loam and loamy soils are mainly found in Damodar and Dwarkeswar river flood plains. (Assessment of water resources and management of the Bankura District, WCT, 1993)

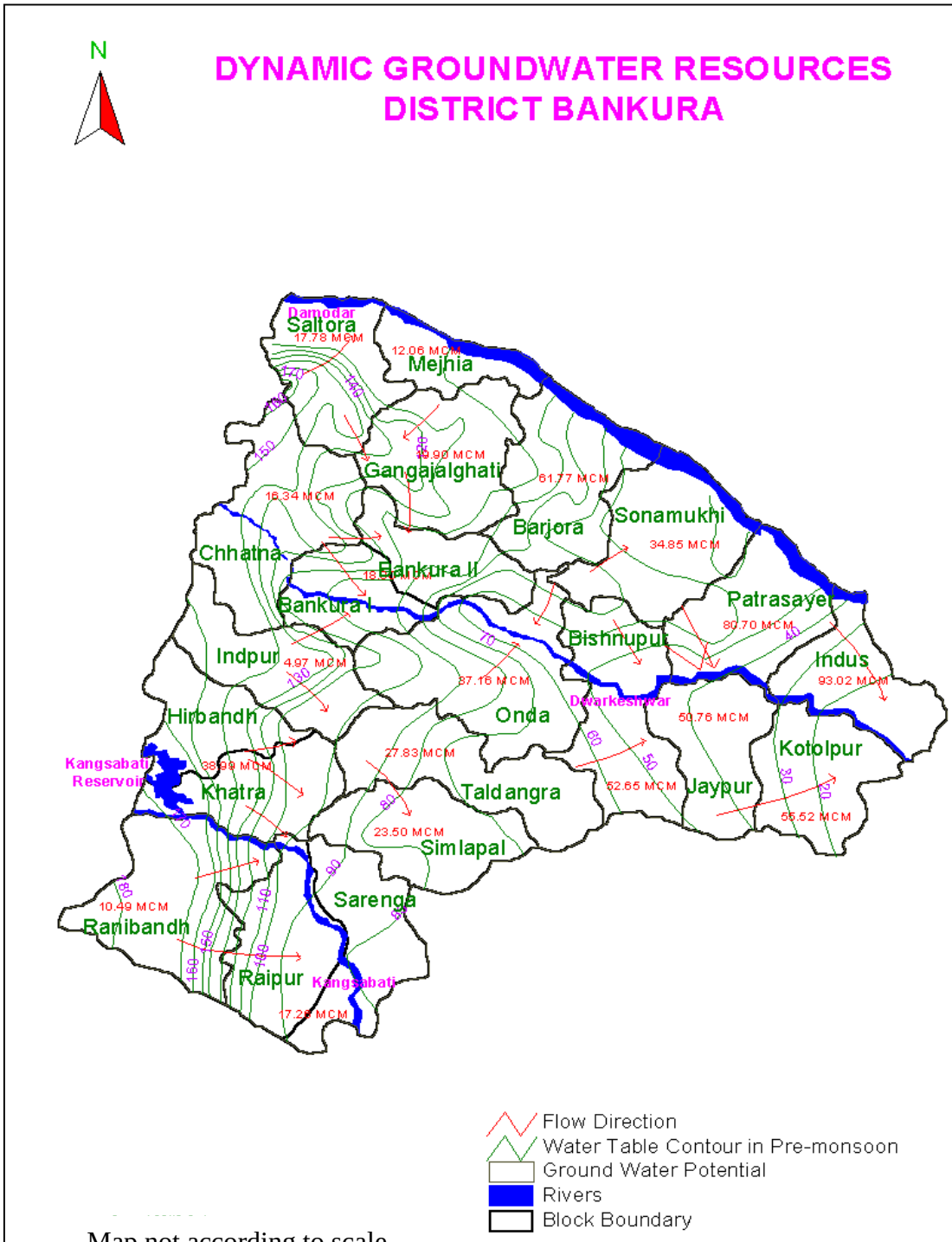
Rivers

There are three major river basins in Bankura district. These are the Damodar river, Darakeshwar river and Kangsabatiriver. Damodar river flows along the northern border of the district. This river originates in the Chhotanagpur plateau and flows from north-west to south-east direction in the direction. Major tributaries of the Damodar river in the district are Bedai and Sali.

The Darakeshwar river flows from west to east, splitting the district into halves. The lower course of the Darakeshwar river is known as Rupnarayan, which joins with Bhagirathi as one of its important tributaries. The tributaries of Darakeshwar are Silabati, Arkusa, Borai, Gandheswari and Joypanda. Kangsabati, the third significant river flows in the southern part of the district.

Woodland features

The forest covers approximately 21.53% of the total district area. The recorded forest area of the district is approximately 1482 km² with 80 km² of reserved forest, 1311 km² of protected forest and 91 km² of unclassed state forest. There are three forest divisions in the district - Bankura South, Bankura North and Panchet Soil Conservation division. The fieldwork for this research has been conducted in Bankura South forest division, where the amount of forest cover is higher (563 km² out of 1482 km² of area) compared to the other two forest divisions. Based on the nature of plantation, the district forests can be divided into four categories – a) Sal forest, b) miscellaneous forest, c) planted forest and d) thorny and bushy vegetation with or without small and scattered vegetation.



Map not according to scale

Fig. 3: Main water channels of Bankura district

Source: NRDMS, Bankura

Agriculture activities

The climatic conditions, different topography, hydrology and soil combinations are major influential factors in case of agricultural activities in the District. The gross cultivated area is about 600,000 ha, including 430,000 hectares of net cultivable area. Bankura district can be divided into two agro-climatic zones.

Table 4: Agro-climatic regions of Bankura district		
Sl No.	Agro-climatic zones	Blocks
1	Undulating red & lateritic zone	Sonamukhi, Joypur, Bishnupur, Ranibandh, Gangajalghati , Borjora, Saltora, Onda, Taldangra, Simlapal, Mejhia, Raipur, Sarenga, Chhatna, Indpur, Khatra, Hirbandh, Bankura-I and Bankura-II blocks
2	Vindhyan alluvial zone	Patrasayer, Indus, Kotulpur blocks
Source: http://bankura.gov.in/Agriculture/Agri1.htm (cited on 5th June 2009)		

In the red and lataritic rolling area, agricultural activity is mainly monsoon rainfall oriented. In most cases the ground water level is very low. Where irrigation is available more than one crop can be harvested. Approximately 46% of the net cultivated area is under irrigation. Rice, wheat, oilseeds and vegetables are the main agricultural products of the district. Among the different oilseeds; rape, sesamum and mustard are important. Sesamum is produced three times a year while rape and mustard is grown during the *Rabi* (winter) season (http://bankura.gov.in/Agriculture/Agri1.htm, cited on 1st June 2009)

Mineral Resources

The major minerals of the District are coal and kaolin (China clay). The coal mines are found in Khatra, Ranibandh, Mejhia and Borojora areas. The coal of Borojora region belongs to high volatility, high-ash and non-coking type with moisture between 4.5 and 6.0%. According to the Geological Survey of India, the proven reserve of coal is 12 million tonnes and 13.14 million tonnes in Borojora and Mejhia regions respectively. Many kaolin deposits are located in the Raipur and Khatra block areas. The deposits are about 45 Km long. In the south-western part of the district a few tungsten, copper and lead mines exist. Mica, quartz, feldspar and vermiculite are also available in several parts of the District. Other minerals obtainable from the District include dumertierite, quartz, magnetite, quartizite, decorative stones, dolomite, limestone, gravel and road metal (http://bankura.gov.in/Resources/Mineral.htm, cited on 1st June 2009).

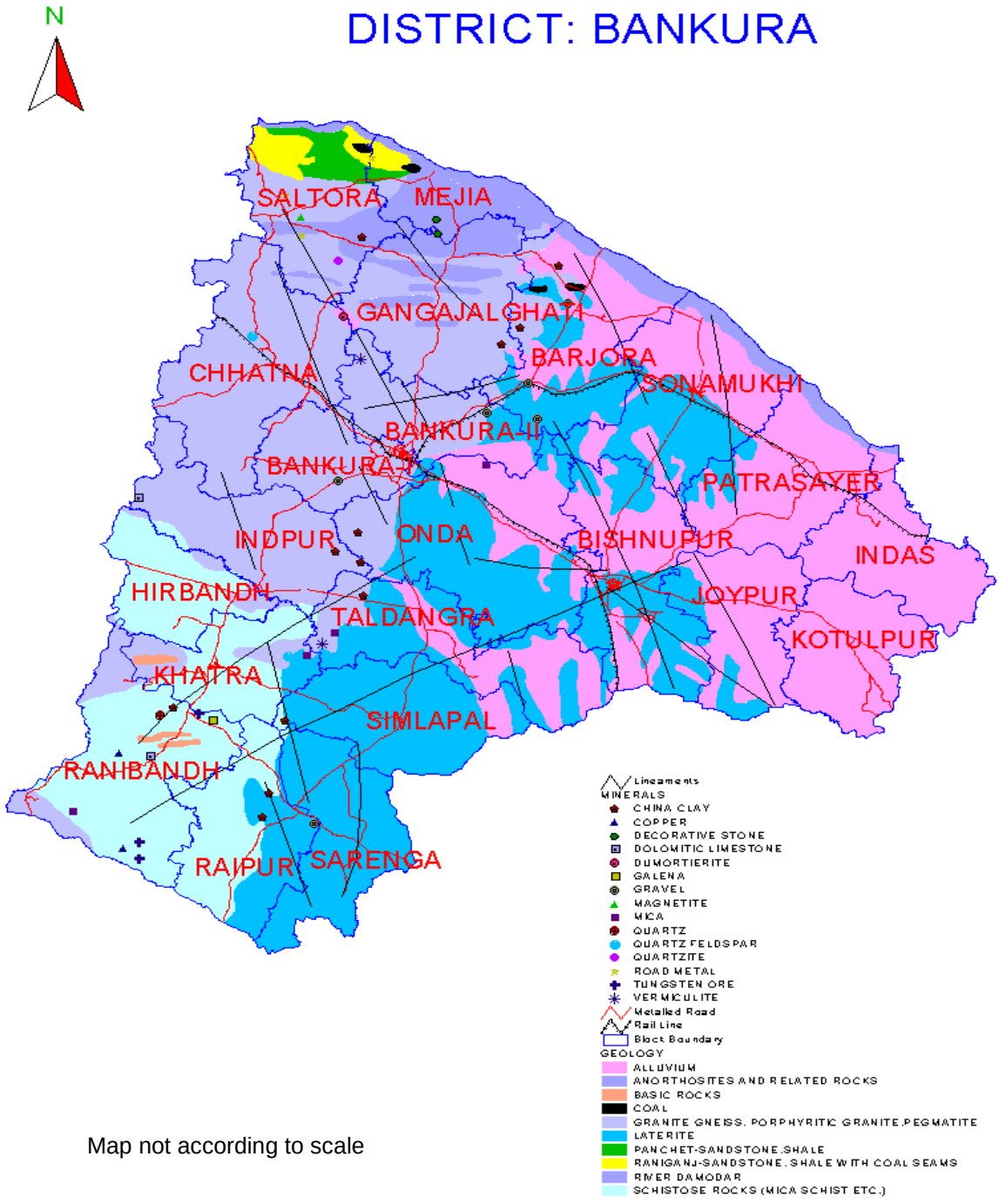


Fig. 4: Distribution of minerals in Bankura district

Source: NRDMS, Bankura

Industrial profile

The mining and minerals based industries are increasing in the blocks like chhatna, Saltora Khatra, Ranibundh, Bankura, Indpur, Raipur and Taldangra. There are some agro-industries such as rice and oil producing centres in Bishnupur, Sonamukhi, Patrasayer, Indus, Joypur, Kotulpur block area. This industrial development will not only create employment opportunities for local communities, but will also help to achieve the task of natural resource conservation. Apart from this, much of the areas have undulating alluvial sandy soil which cannot retain water. Most of these sites are either under monocrop production or fallow. Some herbs that need little irrigation can be grown in this area.

Moreover, new types of herbs and medicinal plants can be planted in forest areas and unused barren land. Cottage and small scale industries are another important source of income. It offers important employment opportunities in addition to agriculture and this sector has a 9 % share of the District's total economy. Efforts have been made to improve the marketing and sale of brass handicrafts, conch shell products, fishing hooks, pottery and leather products etc. The uses of machineries for rope making from Babui grass and Sal plate making have contributed well to the rural economy, particularly in tribal villages (http://bankura.gov.in/Industries/industriesl_1.htm, cited on 3rd June 2009).

Demography characteristics

According to the 2001 Census Bankura is the 4th most populated district in West Bengal with a total residents of 3,192,695 including 1,636,002 men and 1,556,693 women. The sex ratio in the course of the year was 952 women to 1000 men. In 2001, over 92% of the total district population used to live in rural areas and only 7% in urban areas. Bankura is a schedule caste and tribal dominated district, where 10.36% of the total population are scheduled tribes and 31.24% are schedule castes.

Table 5: Demographic features of Bankura district (Census 2001)

Demographic features	1991 Census	%	2001 Census	%
Total population	2805065	-	3192695	-
Male population	1437515	-	1636002	-
Female population	1367550	-	1556693	-
Rural population	2572587	-	2957447	92.63
Urban population	232478	-	235248	7.37
Scheduled caste	879931	31.37	997408	31.24
Scheduled tribe	289906	10.34	330783	10.36
Sex ratio	951	-	952	-
Population density (per sq. km.)		-	464	-
Decadal growth rate		-	1.19	-

Source: http://bankura.gov.in/Census/PCA/PCA.htm (cited on 7th June 2009)

Occupational features

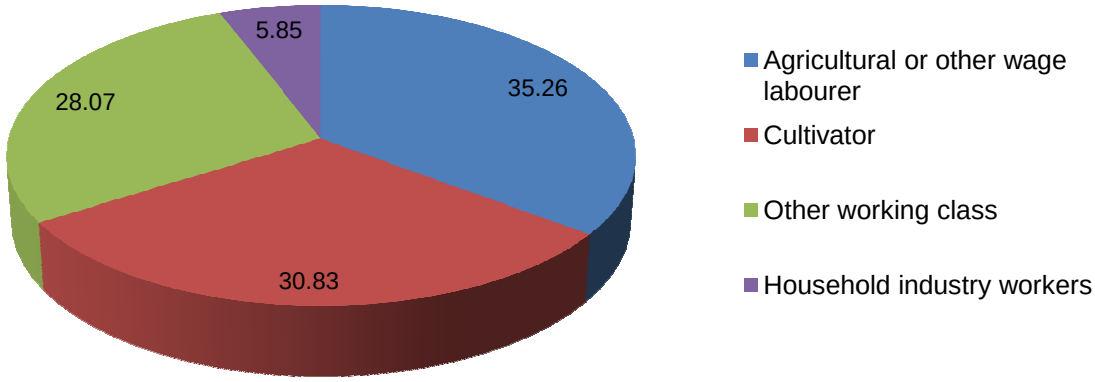
In 2001 the total number of working people, including main and marginal workers was 1,427,272 (marginal - 483,056), whereas the non-working population was – 1,765,423. Agricultural or other wage labourers made up 35.26%, cultivators comprised 30.83%, other working class including forest products collectors comprised 28.07%, and 5.85% were household industry workers.

Table 6: Number of working people in different occupations in Bankura district

Occupational sectors	Total	Male	Female
Cultivators	439957	331925	108032
Agricultural labourers	503214	260099	243115
Household industry workers	83492	34994	48498
Other workers	400609	301418	99191

Source: District Human Development Report Bankura, 2007

Graph 1: Percentage of working population involved in different professions in Bankura district (2001)



Ranibandh Block

Geographic location

In Bankura district, the fieldwork for this study was conducted in Ranibandh Gram Panchayat area of Ranibandh block. Ranibandh Block is located at south-western part Bankura district. The block is encircled with the Khatra and Hirbandh block in the north and Raipur block of Bankura district in the south-east; Purulia district in the West and West Midnapur district in the south. The latitudinal and longitudinal position of the block is limited by the 22° 48' N 22° 52' N latitudes and 86° 41' E and 86° 45' E longitudes.

Administrative division

Ranibandh block area is located in Khatra subdivision. The block comprises 428.51 km² area including eight gram panchayats (Ambikanagar, Barikul, Haludkanali, Puddi, Rajakata, Ranibandh, Routora and Rudra village panchayats) and 186 villages (including 169 inhabited).

Physiographic features

The area is largely covered with undulating terrain with small hillocks. This part of the district is regarded as an extension of the Chhotanagpur plateau. In the western part of the block there are some small hills, whereas, towards the east the surface is fairly plain. Hills and highlands are covered with woodlands, while plain lands are used for agricultural activities.

Climate

The area has mostly gently undulating terrain with dry cool winters and very hot summers with average temperature of 22 °C and 34 °C respectively. The highest summer temperature goes up to 48 °C, whereas in winter the lowest temperature could be about 5 °C. From November the temperature steadily falls and it is lowest in the month of January. The maximum temperature is recorded in the month of May. The temperature fluctuation is usually noticed in the months of July to October. The monsoon starts from mid June and continues until the end of September. During the month of April and May the north-westerly brings some showers in the block. The normal annual rainfall in the block is less than 1200 mm.

Soil

In Ranibandh block mainly metamorphic rocks such as gneiss and schist of the Gondwana system are found. The sedimentary soil, which is produced from the parent materials, is mainly seen in the hilly forest area of the block. The exposure of bare land surfaces with heavy grazing has caused severe soil erosion in the Block.

Table 7: Soil analysis chart of Ranibandh block, Bankura

Sl No.	Details of the soil sample	P.H.	P.C. of gravel	P.C. of fine sand	P.C. of silt	P.C. of clay	Apparent density	Water holding capacity	Pore space
1	Ranibandh range, Raigarh mouza, Top Hill	7.08	51.49	71.46	12.5	16.1	0.44	65.07	53.99
2	Do	7.06	77.64	70.0	12.0	18.0	0.93	64.25	53.45
3	Do	6.92	68.41	71.0	10.0	19.0	0.96	57.01	49.76
4	Do	7.34	41.56	89.2	5.8	5.0	1.08	49.76	45.76
5	Do	7.15	54.41	79.2	6.9	13.9	0.96	57.28	49.20
6	Ranibandh range, Raigarh mouza, Mid-Hill	6.43	34.45	67.3	16.7	16.0	0.87	71.78	56.30
7	Do	6.86	80.32	66.4	14.0	19.7	0.95	57.76	52.77
8	Do	7.05	73.50	70.0	10.8	19.2	1.01	56.32	53.64
9	Do	7.27	36.50	80.2	7.9	11.9	0.83	69.65	55.42
10	Ranibandh range, Raigarh mouza, Bottom Hill	6.92	64.89	65.7	16.3	18.0	0.88	67.41	55.92
11	Do	6.20	73.04	60.5	14.9	24.6	0.98	57.44	53.83
12	Do	6.79	59.61	70.7	11.8	17.5	0.96	54.91	50.48
13	Ranibandh range, Lodapukur mouza, end of slope of hill	7.13	55.09	72.6	10.9	16.5	0.94	58.29	52.38
14	Do	6.60	77.18	74.8	7.4	17.8	0.96	55.10	51.12
15	Do	7.12	74.77	80.5	5.0	14.5	0.96	28.31	49.33

Source: Second Working Plan of Bankura Forest Divisions, 1997-98 – 2015-16, p. 18

Rivers

Kangsabati is the principal river of the block. A few tributaries of Kangsabati also pass through the block. Originating from the hilly area in Jhalda block of Purulia district, the river flows from west to south-east direction in Bankura district. The river flowing through Khatri, Ranibandh and Raipur block area. The important tributaries of Kangsabati flowing through the block are Kunar, Bhairalbanka, Tarapani etc.

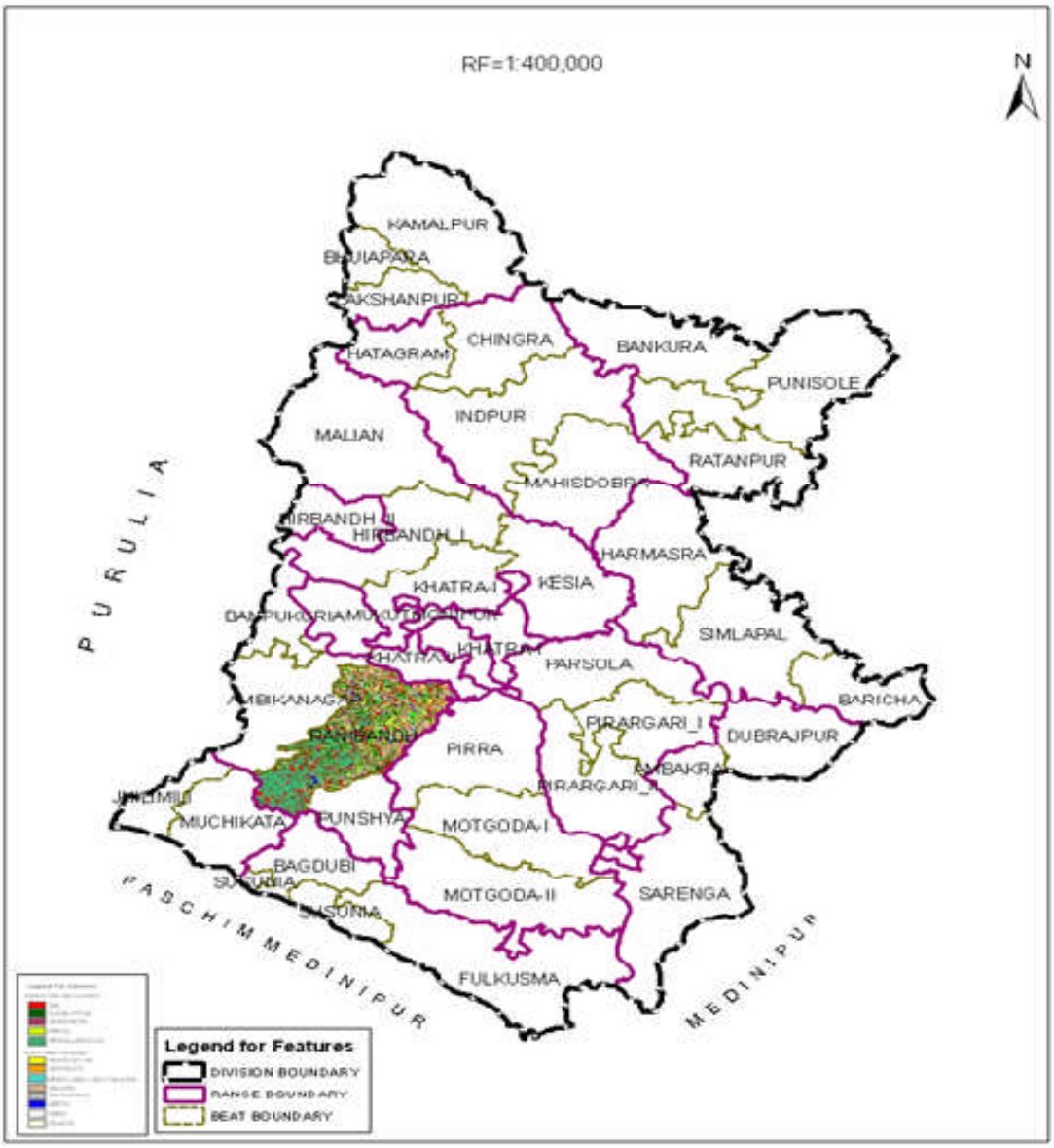


Fig. 5: Bankura South Forest Division with Ranibandh Forest Beat Area

Source: Department of Forest, Govt of West Bengal, Kolkata

Forestry

Ranibandh block is positioned in the Bankura South Forest division. The overall forest area of the block is 6595.396 hectares. The quality of woodland covers in the block is fairly good. Mainly Sal forest, associated with other species such as Bahera, Dhaw, Sidha, Mahua, Kend, Peal, Peasal etc are seen there. However, in some forests miscellaneous species are found and the presence of Sal tree is insignificant there.

Table 8: The nature of forest covers in Bankura district (1991 – 2005 area in ²Km)				
Year	Geographic area	Dense forest	Open forest	Total forest
1991	6882	153	600	753
1993	6882	160	660	820
1995	6882	197	653	850
1997	6882	226	641	867
1999	6882	233	636	869
2001	6882	453	482	935
2003	6882	101	295	980
2005	6882	415	612	1027
Source: State Forest Reports, Forest Survey of India, 1985				

Agriculture

Because of the extremely dry weather conditions and soil structures, agricultural activities depend on monsoon rains. Irrigation is not sufficiently developed for year-long farming. As a result, people work as agricultural wage labourers during the cultivation period and collect forest products or undertake other wage-labour for the rest of the year. Main crops grown in the block are paddy, wheat, mustard, potatoes, sugar cane and some vegetables. Crops are grown mainly to supply domestic requirements. Due to the small land holdings, farming is not a cost-effective business today.

Mineral Resources & industrial activities

The important minerals, available in the Block are coal, white clay, copper ore, garnet etc. However, very few mineral-based industries exist. The forest resources of Khatra and Ranibandh areas have a significant value. Various NTFPs, including medicinal herbs, are regularly exported to neighbouring districts and even outside the state. Thus small and medium scale industries based on non-timber forest products, including medicinal plants, could be established in the Block.

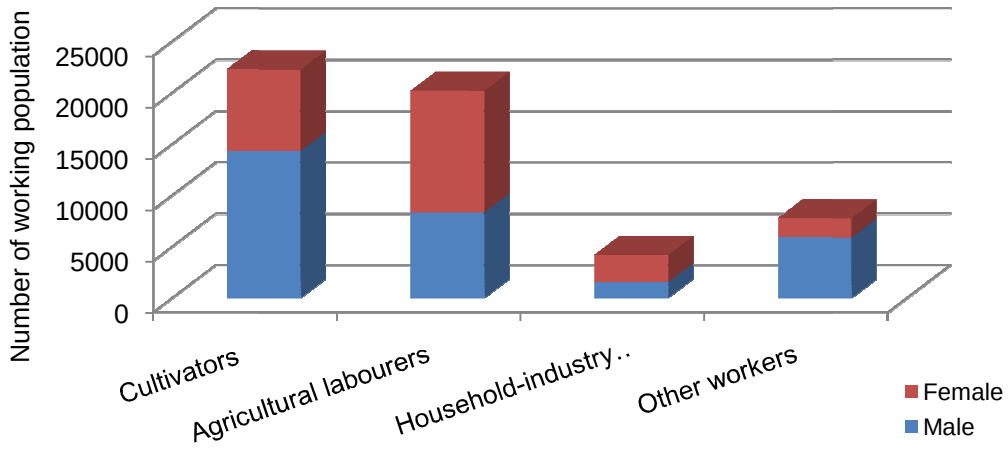
Demographic features

According to the Census 2001, the total population of the block was 104,326 with a density of 243 per square kilometre. The sex ratio was 962. The literacy rate of the block was about 53%. There is no urban area in the block. Of the total population, Scheduled Caste and Scheduled Tribe was 11.24% and 47.28% respectively. This is one of the most important reasons for the selection of this block for this research. Since most of the tribal villages are located within or at the outskirts of forest areas so normally these villagers go for forest products collection on regular basis for their subsistence as well as for commercial purposes. Most of the working population of the block are involved with agricultural activities or work as agricultural wage labourers within the district or even sometimes go to adjacent districts. In

general, during the cultivation period labourers migrate for agricultural work and during the rest of the year, forest product harvesting is an important profession. Due to the lack of industrial activities or the presence of government or non-governmental sectors in the block, very few people work in organised sectors. Small scale industrial units including oil-producing units, rice mills, Sal plate making, Bidi making etc are mostly found in Ranibandh area.

Table 9: Demographic features of Ranibandh block (Census 2001)				
Demographic features	Total	Male	Female	%
Area (In Km²)	428.51	-	-	-
Total household	21132	-	-	-
Population	104326	53168	51158	
Population density (per sq. km.)	243	-	-	-
Sex ratio	962	-	-	-
Child population (Age group 0-6)	14356	7307	7049	13.76
Rural population	104326	53168	51158	-
Urban population	-	-	-	-
Scheduled caste	11730	6013	5717	-
Scheduled tribe	49321	24912	24409	-
Number of literates	55550	36238	19312	-
Number of illiterates	48776	16930	31846	-
Main workers	32510	23801	8709	31.16
Marginal workers	21990	6352	15638	21.08
Total workers	54500	30153	24347	-
Non-workers	49826	23015	26811	47.76
Cultivators	22308	14306	8002	40.93
Agricultural labourers	20196	8339	11857	37.06
Household-industry workers	4201	1558	2643	7.71
Other workers	7795	5950	1845	14.30
Source: http://bankura.gov.in/Census/PCA/PCA.htm (cited on 8th June 2009)				

Graph 2: Number of working population in different professions in Ranibandh block area (2001)



Jamdaha village

Based on the dominance of scheduled castes and scheduled tribes and their dependency on forest, three villages were selected in Ranibandh block for this research. These are Jamdaha, Barudi and Katiam. The total geographical area of the Jamdaha village is about 49 hectares. In 2001 the total population of the village was 119 including 62 male and 57 female. The child population at the same period was 37.

Table 10: Demographic features of Jamdaha village (Census 2001)

Demographic features	Total	Male	Female
Number of households	19	-	-
Population	119	62	57
Sex ratio	919	-	-
Child population (Age group 0-6)	37	14	19
Scheduled caste	-	-	-
Scheduled tribe	119	62	57
Number of literates	48	32	16
Number of illiterates	71	27	44
Main workers	51	34	17
Marginal workers	24	9	15
Non-workers	44	18	26
Cultivators	15	9	6
Agricultural labourers	68	42	26
Household-industry workers	5	2	3
Other workers	36	13	21

Source: Block Development Office, Ranibandh, Bankura

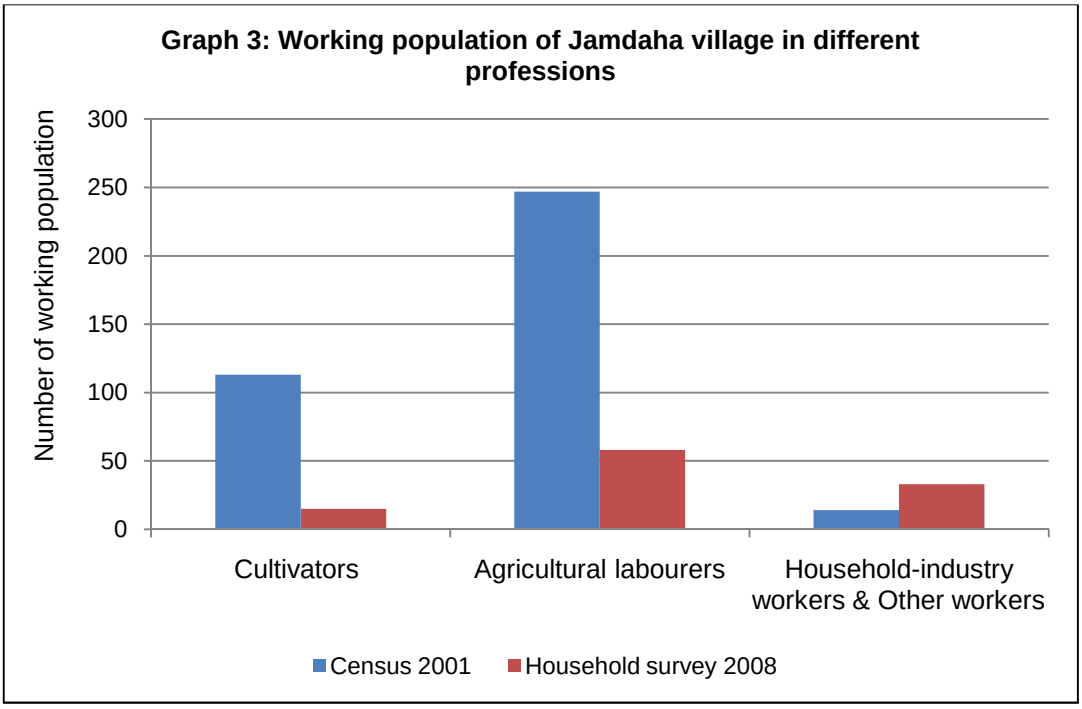
This is a tribal village within the forest area and the distance from the nearest market is 10 km. Most of the working population of the village work as agricultural wage labourers during the period of cultivation. In the rest of the year they collect forest products for domestic as well as commercial purposes. A few of them have their own cultivated land within the forest area. However, because of the small land holdings they do farming mainly for their household food production.

Table 11: Household survey at Jamdaha village in 2008

	Total	Male	Female
Number of households surveyed	19	-	-
Household population	128	67	61
Child population (Age group 0-6)	33	-	-
Scheduled caste	-	-	-
Scheduled tribe	128	67	61
Other communities	-	-	-
Number of literates	57	-	-
Number of illiterates	71	-	-
Cultivators	18	-	-
Wage labourers	64	-	-
Other workers including NTFPs collectors	36	-	-

Source: Based on questionnaire survey

From the household survey in 2008 it has been noticed that the population has increased from 119 to 128. However, the working population in different fields is the same as it was in 2001.



Barudi village

The total area of the Barudi village is 395.80 hectares. The village is located at the forest fringe area. The village is 1.5 – 2 km away from the forest. The nearest local market is at Ranibandh, about 6 km away from the village.

In 2001 the number of households was 35 with a total population of 184 including 91 male and 93 female. This is a tribal village with 51.63% literacy rate.

Table 12: Demographic features of Barudi village (Census 2001)

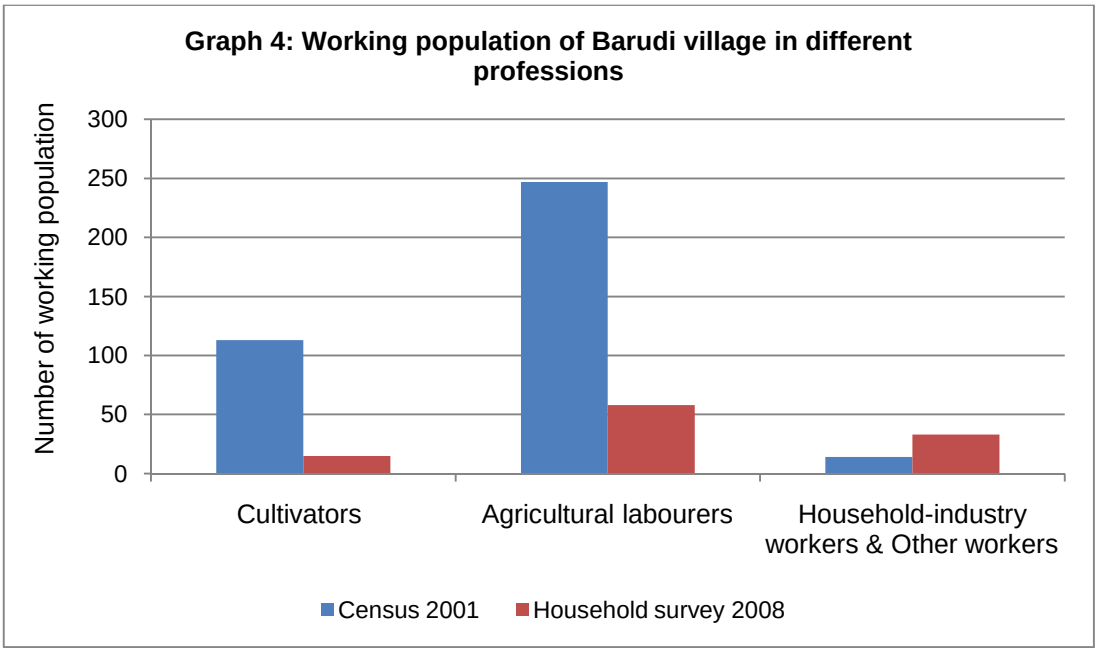
Demographic features	Total	Male	Female
Number of households	35	-	-
Population	184	91	93
Sex ratio	1021	-	-
Child population (Age group 0-6)	18	8	10
Scheduled caste	-	-	-
Scheduled tribe	184	91	93
Number of literates	95	66	29
Number of illiterates	89	25	64
Main workers	52	39	13
Marginal workers	39	10	29
Non-workers	93	42	51
Cultivators	33	27	6
Agricultural labourers	46	18	28
Household-industry workers	7	-	7
Other workers	5	4	1

Source: Block Development Office, Ranibandh, Bankura

Most of the working population of the village are involved in agricultural activities. During the non-farming period their main profession is forest product collection. Sal plate making is a good business for these people.

During the household survey in 2008 about 21 households were visited for the research and 112 people participated including 53 male, 59 female and 22 child members. The percentages of working people involved in different professions are same as they were in 2001.

Table 13: Household survey at Barudi village in 2008			
	Total	Male	Female
Number of households surveyed	21	-	-
Household population	112	53	59
Scheduled caste	-	-	-
Scheduled tribe	112	53	59
Other communities	-	-	-
Child population (Age group 0-6)	22	-	-
Number of literates	53	-	-
Number of illiterates	59	-	-
Cultivators	21	-	-
Wage labourers	45	-	-
Other workers including NTFPs collectors	30	-	-
Source: Based on questionnaire survey			



Katiam village

The total geographical area of the Katiam village is 340.18 hectares. The distance of this village from the nearest forest is about 2.5 km and the distance from the nearest market is also same. In 2001 the total number of households was 134 with a total population of 638 including 336 male and 302 female. It is mainly a tribal dominated village, although, some Other Backward Class (OBC) people are also living there. The literacy rate of the village was 42.63%.

Table 14: Demographic features of Katiam village (Census 2001)

Demographic features	Total	Male	Female
Number of households	134	-	-
Population	638	336	302
Sex ratio	898	-	-
Child population (Age group 0-6)	88	47	41
Scheduled caste	-	-	-
Scheduled tribe	596	313	283
Number of literates	272	206	66
Number of illiterates	366	130	236
Main workers	290	173	117
Marginal workers	84	26	58
Non-workers	264	137	127
Cultivators	113	86	27
Agricultural labourers	247	103	144
Household-industry workers	-	-	-
Other workers	14	10	4

Source: Block Development Office, Ranibandh, Bankura

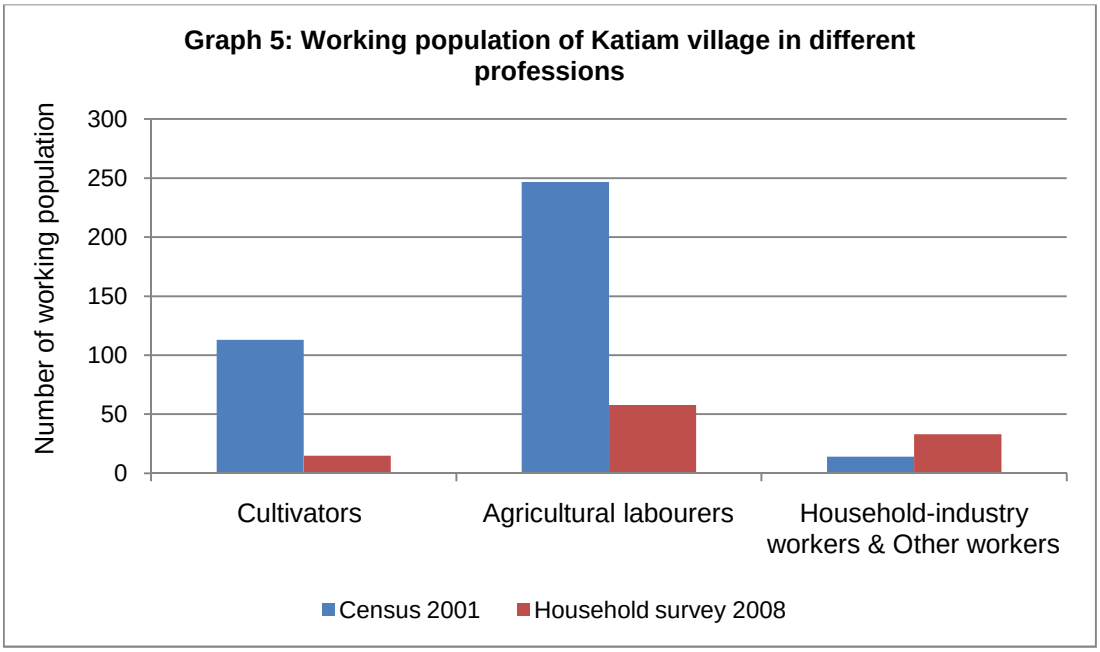
Most of the working population are cultivators or agricultural wage labourers. There is no household industry worker in the village. During the non-agricultural period they usually collect Sal leaves for making plates and firewood to sell at the Ranibandh local market. A NTFPs collection centre of Ramakrishna Mission Lokasiksha Parisad is also present in the village. Therefore, whenever the Ramakrishna Mission Lokasiksha Parisad asks villagers to collect any medicinal plants or any other NTFPs, they collect it. A centre of LAMPs is also present for Kendu leaves collection.

Table 15: Household survey at Katiam village in 2008

	Total	Male	Female
Number of households surveyed	20	-	-
Household population	127	68	59
Scheduled caste	-	-	-
Scheduled tribe	127	68	59
Other communities	-	-	-
Child population (Age group 0-6)	23	-	-
Number of literates	54	-	-
Number of illiterates	73	-	-
Cultivators	15	-	-
Wage labourers	58	-	-
Other workers including NTFPs collectors	33	-	-

Source: Based on questionnaire survey

During the household survey for this research, 20 households were surveyed in 2008 including 127 people. About 68 males, 59 female and 23 child members participated in the survey.



From the comparative study of Census 2001 and 2008 household survey report an apparent difference in percentage of cultivators and agricultural labourers have come out. However, the percentage of other workers is quite similar.

District: West Midnapur

Geographical location

West Midnapur is situated in the south-western part of West Bengal. It is bordered by Bankura and Purulia districts in the North, Balasore and Mayurbhanj districts of Orissa in the South, East Midnapur and Hooghly districts in the East and Singhbhum district of Jharkhand and Purulia district of West Bengal in West. The area of the district is between 21° 47' N – 23° 00' N and 86° 40' E – 87° 52' E. The total geographical area of the district is 9295.28 Km^2, whereas, the total forest cover in the district is 173,038 hectares, which is approximately 18.61% of the total geographical area. Of the total geographical area of the district, 585222 hectares (63 %) under cultivation, 18932 hectares (2 %) is cultural waste land, 20132 hectares (2.16 %) barren and uncultivable land, 52179.31 hectares of forest cover and 141290 hectares (15.20 %) under non-agricultural uses. Thus, a vast area is available for various development purposes. The cultivable waste and other fallow lands, which are not usable for arable farming, would be fit for development of horticulture and forestry.

Subdivisions

The district is composed of 4 sub-divisions, 27 police stations, 29 blocks and 8 municipalities. West Midnapur district was created from part of the former Midnapur district and formed as a separate district on 1 January 2002. The number of Gram Panchayat and Maujas are 290 and 8701 respectively including 7580 inhabited and 1237 uninhabited villages.

Topography

In general, the topographical characteristic of West Midnapur district is gently sloping from west to east with small hills in north-western part of the district, which continues and meets the hilly tract of Ranibandh range of Bankura district. The rolling lateritic tract represents valleys formed by several water courses (http://paschimmedinipur.gov.in/about.HTM). So the land surface of the district can be broadly divided into three categories – rocky uplands, lateritic zone and flat alluvial plains. The topography of western part of the district is quite undulating. The rolling topography of the central part of the district is covered with laterite. These rolling plains gradually merge into flat alluvial plains to the east and south east of the district.

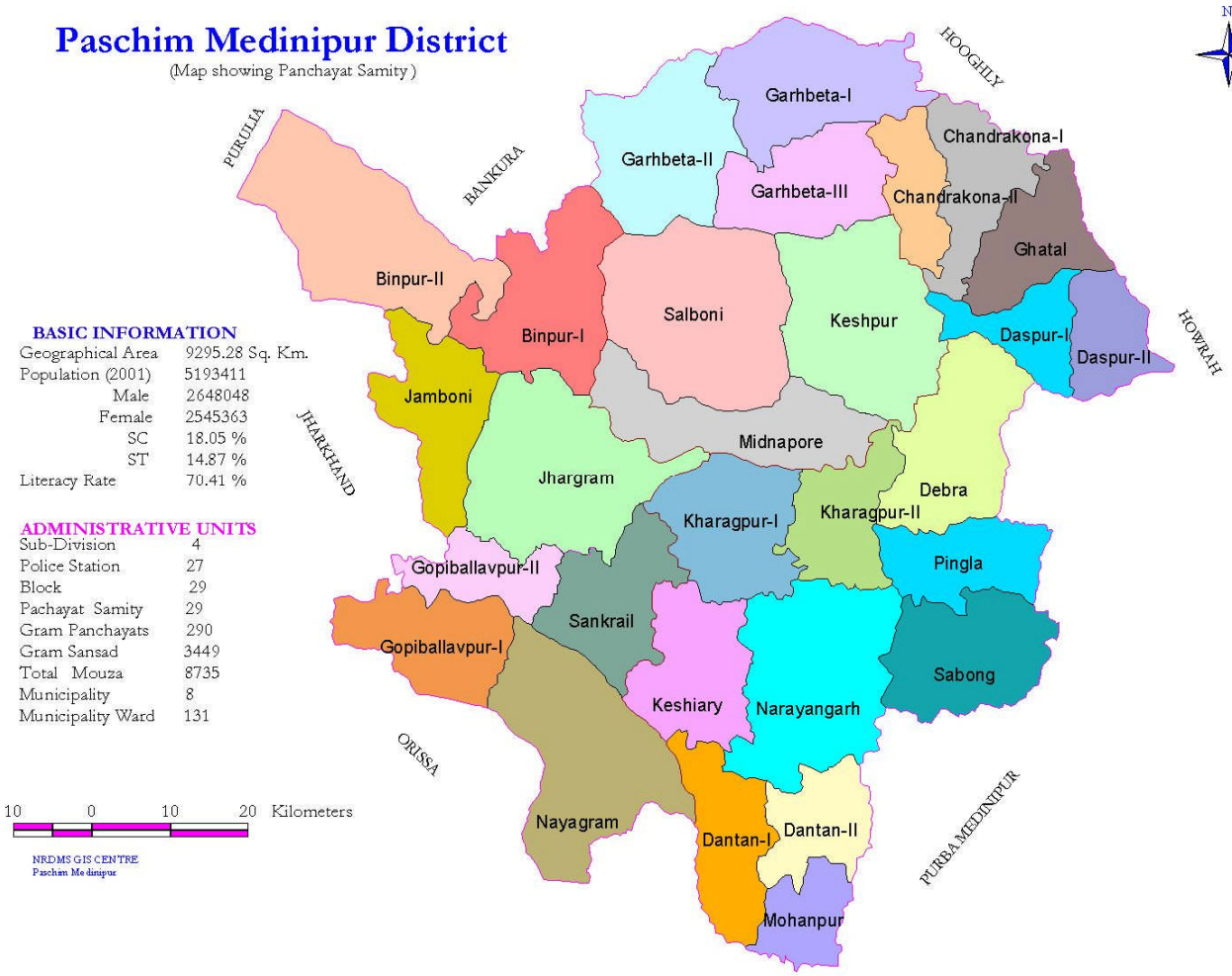


Fig.1: Administrative divisions in West Midnapur district

Source: NRDMS, West Midnapur

Geology

Geologically, this area is mainly composed of alluvial deposits with pebbles and gravel. There are some places in north-western part of the district having older rocks of Precambrian age. The geological characteristic of the western part of the province is quite similar to that of Chhotanagpur plateau area (http://paschimmedinipur.gov.in/about.HTM; cited 25th June 2009). The presence of Archean and Pre-Cambrian rocks of mica-schists and gneisses, quartzite, epidiorites etc is quite noticeable throughout the district. The geological features of the district can be divided into three categories:

Table 1: Sequence of geological formations in West Midnapur district		
Period	Major foundation	Type of rock and/or sediments
Recent and sub-recent to Pleistocene	Newer alluvium	Silts, silt-clays, sands
	Older alluvium	Intercalated sandy and clay layers, coarse pebbles and lateritic gravels
Pleistocene to Tertiary	River deposits	Gravels, sands and clay laterites
Tertiary	Sandstone and shales	Sandstone and shales
Precambrian	Achaean formations	Gray schists, phylite, quartzite, epidiorite, amphibolites of iron series andgranites
Source: Department of Forest, Government of West Bengal, 1997, p. 22		

Climate

The climate can be described as dry sub-tropical with hot summers, cool winters and abundant rainfall during monsoon. The annual rainfall varies from 1450 mm to 1560 mm. Because of the lateritic cover day-night temperature variation is quite clear. The average summer temperature remains above 28° C and while in winter the temperature drops to 22° C. Average annual rainfall in the district is about 1522 mm.

Table 2: Average rainfall in West Midnapur district, 1994 – 2005 (mm)														
Month	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	12 years monthly average	21 years normal
Jan	7.5	24.7	18.5	25.2	49	0	12.3	0	38.1	0	0	12.2	15.8	15.4
Feb	65.8	6.4	12.8	19.4	38.8	0	69.5	1.7	0.3	1.2	3	3.5	18.5	28.8
Mar	3.6	5.2	14.4	65.5	136	0	5.1	49	33.7	67.7	18.2	97.7	41.3	38.8
Apr	19.6	19.2	27.9	84.1	36.9	4.7	51.6	68.7	86.5	25.9	40.2	56.2	43.5	50.2
May	161	90.6	85.2	62.6	69.4	276	175.7	185	121	103	53.2	88.5	122.6	129
Jun	288	156	338	341	150	144	301.3	318	287	273	254	188	253	250
Jul	422	283	283	421	209	408	342.8	317	300	286	242	312	318.7	327
Aug	398	338	351	519	86.3	391	227.8	263	266	220	360	275	307.8	314
Sep	291	295	85.7	192	231	375	264.1	195	371	115	199	281	241.1	235
Oct	54.6	90.7	0	43.7	122	170	25.4	179	40.7	418	206	371	143.5	128
Nov	0	0	0	22.9	56.4	12.2	0	7.1	47.9	0	0	0	12.2	28
Dec	0	0	0	30.9	0	0	0	0	0	13.5	0	2.5	3.9	5
Total	1710	1308	1217	1826	1184	1780	1476	1583	1592	1523	1376	1687	1522	1549
Source: Basu, 2008, p. 6														

Table 3: Monthly maximum and minimum temperature and humidity in Midnapur district (1982)			
Months	Max Tem (°C)	Min Tem (°C)	% of Relative humidity
January	27.88	15.60	60.03
February	28.81	17.60	54.73
March	31.38	20.39	60.74
April	35.36	24.00	64.60
May	39.57	26.56	49.61
June	35.45	25.45	72.95
July	34.73	26.12	73.80
August	31.89	26.07	84.56
September	32.54	25.53	75.60
October	33.42	23.30	63.63
November	29.71	18.73	57.95
December	27.72	14.28	47.66
Source: Forest Survey of India, Eastern Zone, 1985, p. 3			

Soil

Based on the nature of soil the District can be divided into six regions. These are Sandy soil, Sandy loam soil, Loam soil, Sandy clay soil, Clay loam soil and Clay soil. The sandy soil is found in 70283 hectares area, whereas, sandy loam and loam soils are found in 237350 hectares and 104220 hectares area respectively. The amount of clay loam soil covered area is highest about 75210 hectares.

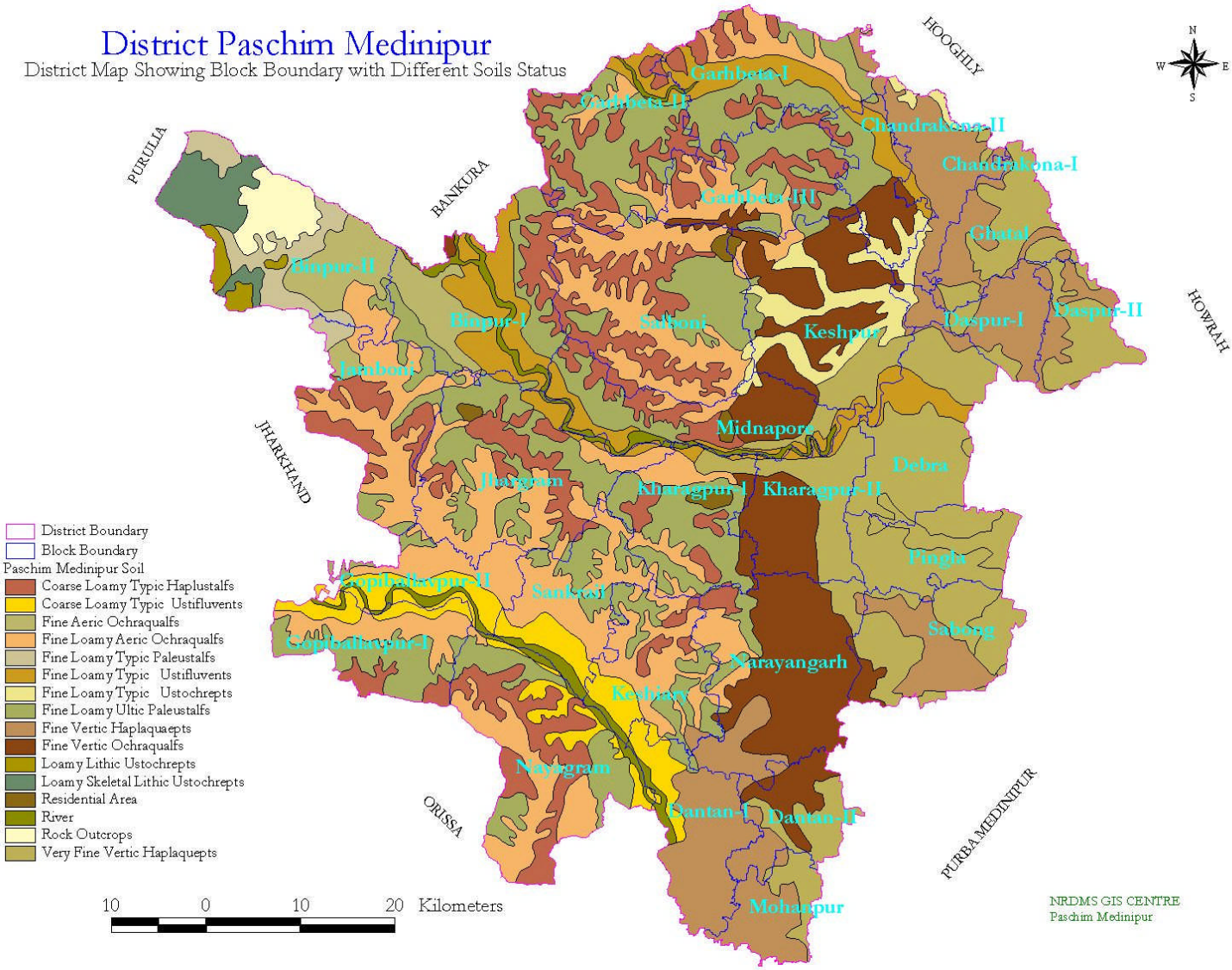


Fig. 2: Soil map of West Midnapur district

Source: NRDMS, West Midnapur

Rivers

The main river channels of the district are Rupnarayan, Kangsabati / Kasai or Keleghai, Silabati, Subarnarekha, Dulong, Keleghai and their tributaries. Kasai River flows through the middle of the District from north-west to east dissecting the district into two. The principal tributaries of Rupnarayan River are Silai and Silaboti. This river originates at the Maanbhum district of Jharkhand. The other important river of the district is Subarnarekha which is derives from the adjacent state of Jharkhand. Except Subarnarekha, all the other rivers are tributaries of the river Ganges.

Fig. 3: Rivers of West Midnapur district

Source: NRDMS, West Midnapur

Forestry

Sal is the dominant species and the entire Sal forest in the district is of coppice origin. According to the nature of the vegetation, the forests of this District can be divided into three main categories. These are – a) Sal coppice forest, b) Open scrub forest with sporadic Sal and thorny bushes and c) Plantation forest. The total forest cover in District is 52179.31 hectares.

Table 4: The forest features of Midnapur district (1991 – 2005 area in ²Km)

Year	Geographic area	Very dense	Moderately dense	Open forest	Total forest
1991	14081	-	-	-	-
1993	14081	-	-	-	-
1995	14081	-	-	-	-
1997	14081	-	-	-	-
1999	14081	529 (+3)	-	855	1387
2001	14081	636	-	832	1468
2003	14081	186	573	1814	2573
2005	14081	186	571	1798	2555

Source: State Forest Reports, Forest Survey of India, 1985

Agriculture

Mostly the cultivation in the district is monsoon dependent. However, with the development of irrigation systems the situation has changed in many areas. On the other hand, because of the presence of a few perennial rivers with their tributaries, monsoon inundation in these river catchment areas is quite common. This also affects the agricultural activities of the District.

The most important crop of the district is Paddy. Other important crops are potatoes, wheat, jute, oilseeds, betel vines, peanuts, sugarcane, cashew nut and stick mat. In some areas vegetables are also cultivated for domestic as well as commercial purposes. The agro-climatic condition of the district is favourable enough for the cultivation of mulberries and horticultural crops such as mango, banana, guava, lemon, mousambi, papaya, cashew and jack fruit.

Table 5: Total cultivated area for each product and the amount of products in West Midnapur district (2005-06)

Rice		Food grains		Oilseeds		Potato	
Area	Production amount	Area	Production amount	Area	Production amount	Area	Production amount
654.0	1629.6	674.1	1652.7	84.6	79.6	71.3	1519.6

Source: Basu, 2008, p. 15 [Area in 1000 hectares & production in 1000 tonnes]

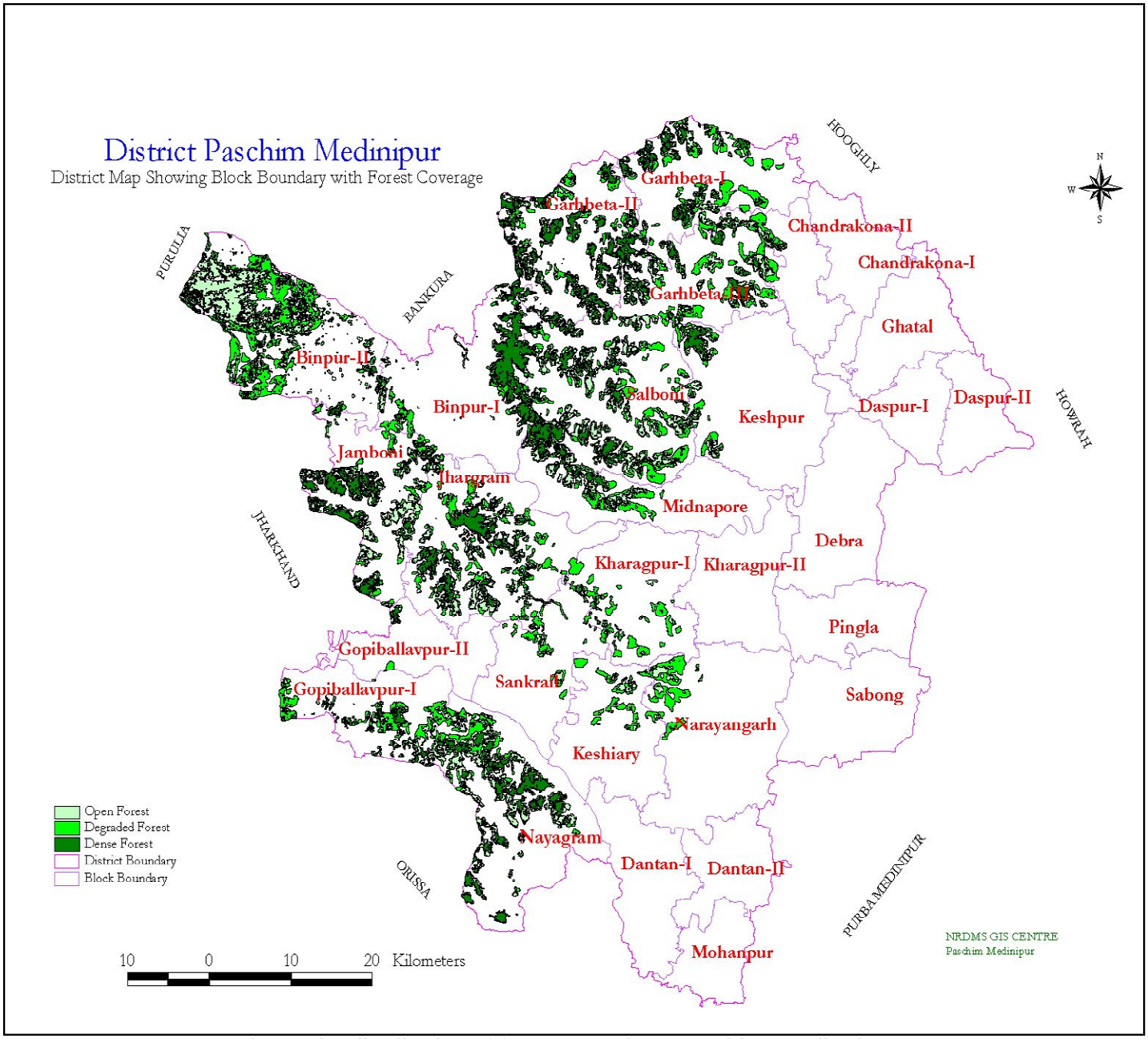


Fig. 4: The distribution of forest areas in West Midnapur district

Source: NRDMS, West Midnapur

Mineral Resources & industries

There is no mining area in the District. About 70% of the total working population are involved in agricultural and allied activities. At the same time, the district has enormous potential for various industrial activities. Currently, the main industrial expansion is happening around Kharagpur. Small Scale industries and cottage industries, based on agriculture, forest products, animal husbandry etc are developing in Jhargarm, Chandrakona Road, Garhbeta and Midnapore area with new technologies and modern marketing facilities. A considerable number of artisans are engaged in the handloom industry.

Demography characteristics

The total population of the district in 2001 was 5193411; including 18.04 % schedule caste and 14.87 % schedule tribes. About 88.10% of the District population live in rural areas while only 11.90 % live in urban areas. This shows that most of the working people are living in rural areas and are involved with informal sectors, particularly in agricultural activities, collecting forest products, small and cottage industries etc.

Table 6: Demographic features of West Midnapur district (Census 2001)			
	1991 Census	2001 Census	%
Total population	4486000	5193411	-
Male population	-	2648048	51
Female population	-	2545363	49.01
Rural population	-	4575651	88.10
Urban population	567567	617760	11.90
Population 0-6 years old	-	752038	14.48
Scheduled caste	-	937000	18.04
Scheduled tribe	-	772000	14.87
Total literates	-	3661355	70.1
Literates (Male)	-	2152863	81.3
Literates (Female)	-	1504310	59.1
Sex ratio	961	-	-
Population density (per sq. km.)	-	-	-
Decadal growth rate	15.76	-	-
Source: Basu, 2008			

Occupational characteristics

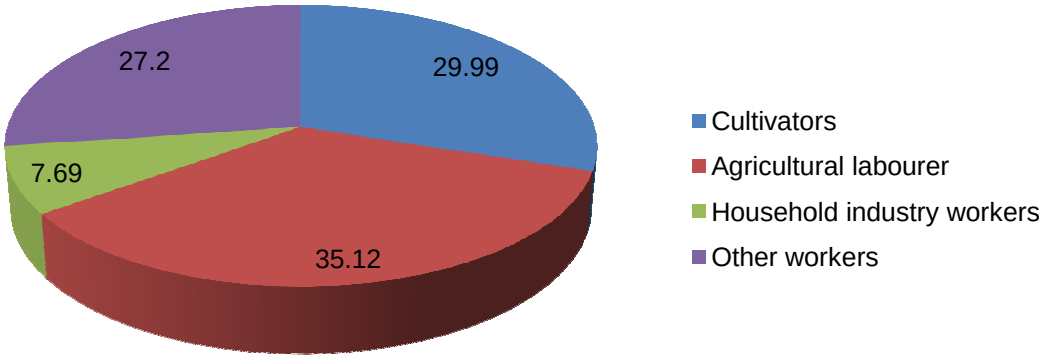
Of the total working population about 34% are cultivators, while 35% are agricultural wage labourers and rest are household industry workers and other workers. A large number of these wage labourers also go to other adjacent districts during the cultivation period. The rural area of West Midnapur is quite well-known for different types of small and cottage industries including forest products based industries and agro-industry. Mat making and Sal plate making are important professions among poor rural people.

Table 7: Number of working people in different occupations in West Midnapur district			
Occupational sectors	Total	Male	Female
Total workers	2131547	-	-
Total non-workers	3061864	-	-
Cultivators	639201	514000	125000
Agricultural labourer	748661	428000	321000
Household industry workers	163984	51000	113000
Other workers	579701	469000	111000
Source: Basu, 2008, p. 11			

About 7.69% of the total working population are involved in household industries. This is an interesting feature compared to Purulia and Bankura districts. Other working people,

including forest products harvestors, of the District are 27.2%. Among this other working population, a huge number of them are involved in forest products collection.

Graph 1: Percentage of different working population to total working population of West Midnapur district (2001)



Jamboni Block

Geographic location

The total area of the block was 32616 hectares in 2005-06. The Block is located between 22° 17' 46" N to 22° 35' 05" N latitude and 86° 45' 16" E to 86° 48' 02" E longitude covering Binpur, Jhargram and Gopiballavpur Blocks of West Midnapur district in its north, east and southern sides, whereas, the western part of the Block is bordered with the Jharkhand State.

Administration

The rural area under Jamboni block consists of ten gram panchayats. These are Chinchra, Dubra, Kapgari, Parihati, Chilkigarh, Gidhni, Kendadangri, Dharsa, Jamboni and Lalbandh. The police station of the Block is at Jamboni, while, the block headquarters is at Gidhni. The total number of villages in the block is 383 out of which 283 are inhabited and the rest are abandoned villages. In 2008 there were 73 *Gram Sansad* (local judicial body) in the Block. The number of Mouzas in the same year was 388 including 283 inhabited.

Physiographic features

In general, the physiographic characteristic of the Block is plain land. However, towards the south the surface is gently undulating covered with dense Sal forest and other bushes. The surface soil is quite hard and not suitable for agricultural activities. Because of this a large amount of uninhabited area is found in the Block particularly in the north-western part. This physiographic characteristic is an important reason behind the dependency on forest and forest products of native dwellers.

Climate

Extreme climatic conditions prevail in the Block. The monthly average minimum and maximum temperature of the Block is as follows:

Table 8: Monthly average minimum and maximum temperature of Jamboni block

Month	Average minimum tem. (°C)	Average maximum tem. (°C)
January	5.55	29.97
February	10.55	30.53
March	14.43	37.19
April	18.87	40.52
May	19.98	42.18
June	22.20	38.74
July	23.31	34.97
August	23.31	34.41
September	22.76	34.97
October	17.76	33.30
November	9.99	31.64
December	7.22	27.75

Source: Department of Forest, Government of West Bengal, 1997, p 30

Very high temperatures with dry wind are the main feature of summer. Sometimes the westerly wind, flowing from the central part of India, allows the temperature to rise to more than 40 °C, whereas, the winter is cool and dry. The relative humidity remains very low in the month of December and January (less than 60%), whereas it is greatest during July and August (above 90%). Maximum rainfall occurs in the month of July when about 1200 mm falls.

Soil

The Block is a laterite dominated area. About 85% of the Block is laterite covered, whereas, only 15% area in the Block is alluvium covered. The total sandy and sandy-loam soil area was 3245 hectares and 15245 hectares respectively in 2005-06. Whereas, at the same period of time the loam soil area was only 710 hectares. The alluvium soil is found in the southern part of the Block.

Rivers

The main river of the Block is Dulung Nadi. This is an important tributary of Subarnarekha River, which meets with it in Sankrail block. The catchment of the river is found in the southern part of the Block. The river has got a few small tributaries. As the general slope of the Block is from west to east so the water courses are flowing towards the south-east originating from the south-western hilly area of the Block. The river and its tributaries are mostly seasonal, except monsoon rest of the year they remain almost dry. Due to the nature of water bodies, the agricultural activities are limited in the Block (http://paschimmedinipur.gov.in/about.HTM).

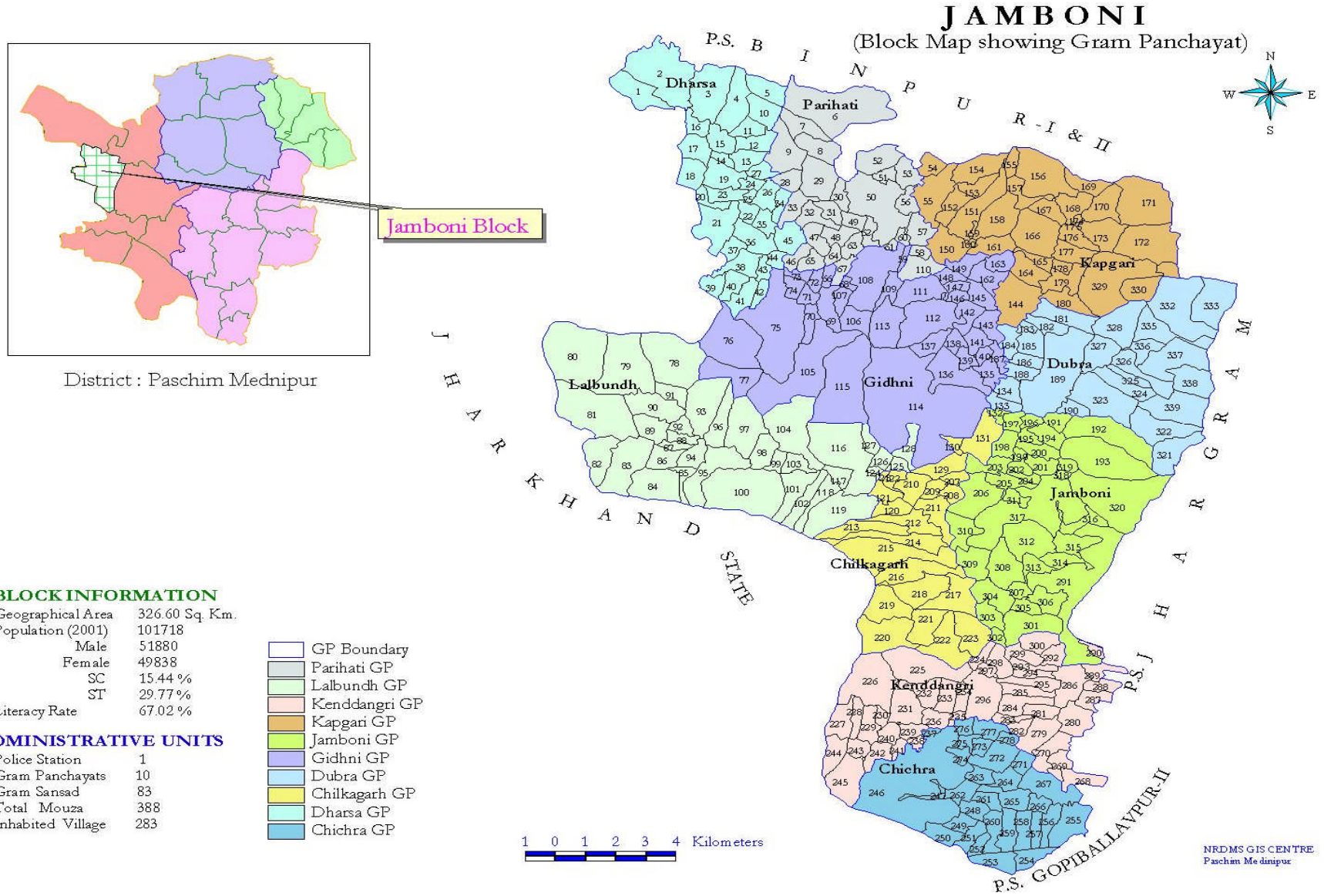


Fig. 5: Jamboni block with Gram Panchayats

Source: NRDMS, West Midnapur

Forestry

In 1991 the total forest area in the Block was 7041.15 hectares and in 2001 it increased to 7051.67 hectares. Therefore, the decadal growth of forest in the block is 0.15%. The largest forest area in the Block is found in Lalbandh Gram Panchayat area. This is a Sal dominated forest area and other species are very limited. Because of this, Sal plate making is a popular job for the native forest dwellers of the Block. Other species are Bhela, Kend, Mahua, Piyal etc. The total forest area in the Jamboni block is 3365.31 hectares.

Agriculture

Total cultivable area in the block was 19751.32 hectares in 2001. Out of this, 3656.55 hectares was under irrigation. In 2005 the total cultivable waste land in the block was 1026 hectares. The net cultivated area in 2005-06 was 15566 hectares (62.61% of total geographical area) and the area under pasture and orchard was 225 hectares. At the same time, double or multi cropping area was 13445 hectares. In 2005-06 the total *Aus* (monsoon) and *Aman* (spring) rice cultivated area in the Block was 721 hectares and 15634 hectares respectively, whereas, the *Boro* (winter) cultivated area was 806 hectares. In the same year the wheat, potato and oilseeds including mustard and *til* (sesamum) cultivated area was 587 hectares, 152 hectares and 607 hectares.

Mineral Resources & industrial activities

There is no mining in the Block. A few cottage and small scale industries are found. These are based on Sal plate making, mat making, *Bidi* (cigarette) making, babui-rope making etc. In some places Tassar cultivation also happen, but that is not individually or personal land. Some agro-forestry based industries are also in the Block.

The existing industries could be improved using modern technology and systematic marketing. Organized production and marketing of pottery, babui grass, cashew processing and packaging, manufacture of gums, manufacture of incense sticks, bamboo and cane work, Sal plate making, Tassar and food including mushroom processing could improve the socio-economic status of the Block considerably without affecting the natural resources.

Demographic features

According to the 2001 Census, the population density in the Block was 320. Out of the total population of the Block, 82% are Hindu and rest are Muslims.

Table 9: Demographic features of Jamboni block (Census 2001)				
Demographic features	Total	Male	Female	%
Area	31822.84 (ha)	-	-	-
Total household	20314	-	-	-
Population	101718	51880	49838	-
Population density (per sq. km.)	-	-	-	-
Sex ratio	961	-	-	-
Child population (Age group 0-6)	14832	7574	7258	-
Rural population	101718	51880	49838	-
Urban population	-	-	-	-
Scheduled caste	15703	8025	7678	-
Scheduled tribe	30285	15347	14938	-
Number of literates	58232	35533	22699	67
Number of illiterates	43486	-	-	-
Main workers	25635	20008	5627	-
Marginal workers	22461	8483	13978	22.1
Total workers	48096	28491	19605	-
Non-workers	53622	-	-	-
Cultivators	7165	6169	996	-
Agricultural labourers	9217	6189	3028	-
Household-industry workers	1810	1105	705	-
Other workers	7443	6545	898	-
Source: Block Development Office, Jamboni, West Midnapur & Basu, 2008, p. 49				

As of 2001 Census data, the total number of households in the Block was 17544. The total area of the Jamboni Gram Panchayat is about 4182.4 hectares with 1934 households. According to the Census data the total population of the Gram Panchayat was 9223 consisting of 4697 males and 4526 females.

Most of the people in this Block are involved in agricultural activities. Outside the main agricultural season, large numbers of people (who are considered in the Census as 'other workers') collect forest products. Sal plate making and mat-making is a popular job for these people.

Table 10: Demographic features of Jamboni Gram Panchayat (Census 2001)

Demographic features	Total	Male	Female
Area (In hectare)	4182.4		
Total household	1934		
Population	9223	4697	4526
Population density (per sq. km.)			
Sex ratio	964		
Child population (Age group 0-6)	1372	701	671
Rural population	9223	4697	4526
Urban population	-	-	-
Scheduled caste	1883	969	914
Scheduled tribe	2176	1141	1035
Number of literates	5036	3097	1939
Number of illiterates	4187		
Main workers	1856	1581	275
Marginal workers	2628	1012	1616
Total workers	4484	2593	1891
Non-workers	4739		
Cultivators	702	644	58
Agricultural labourers	485	408	77
Household-industry workers	40	24	16
Other workers	629	505	124

Source: Block Development Office, Jamboni, West Midnapur & Basu, 2008, p. 49

Fig. 6: Jamboni Gram Panchayat Area wit Mouza Boundary

Source: Sub Divisional Office, Jhargram, West Midnapur

Dakshinsol – Bhaluka village

The fieldwork for this research has been conducted in Jamboni Gram Panchayat area of Jamboni Block. The villages are surveyed of this Gram Panchayat area are Dakshinsol, Harinaganj, Kendua and Shushni. These villages were selected because the percentage of scheduled caste, tribes and other backward class populations compared to the total population of these villages was higher relative to other villages. Most of these villagers are also dependent on forest products for commercial as well as domestic purposes. The total geographical area of Jamboni Gram Panchayat is 4182.4 hectares. Out of this, 1574.2 hectares area is forest covered while, 112.45 hectares is fallow land.

The total geographical area of Dakshinsol – Bhaluka village is 241.4 hectares; out of which 68 hectares is forest covered. There are 106 households in the village with a total population of 497 including 57 cultivators, 36 other workers including forest produce collectors. The rest are classified as 'other workers'.

Table 11: Demographic features of Dakshinsol village (Census 2001)

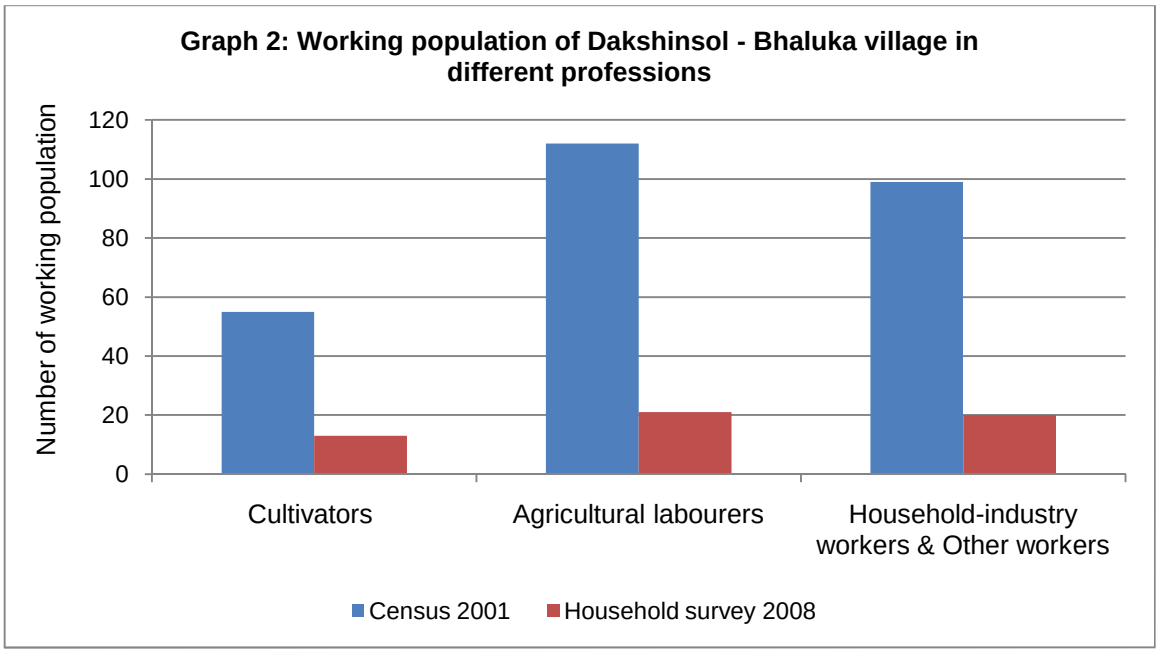
Demographic features	Total	Male	Female
Number of households	106		
Population	497	247	250
Sex ratio	1012		
Child population (Age group 0-6)	30	13	17
Scheduled caste	-	-	-
Scheduled tribe	72	39	33
Number of literates	319	187	132
Number of illiterates	178		
Main worker	98	83	15
Marginal workers	116	52	64
Total workers	214	135	79
Non-workers	283		
Cultivators	57	49	8
Agricultural labourers	4	4	-
Household-industry workers	1	1	-
Other workers	36	29	7

Source: Block Development Office, Jamboni, West Midnapur

For this research, 15 households have been surveyed and a total of 68 people including male, female and child members participated in surveys and interviews.

Most of the villagers that participated in the household survey were either wage labourers or other workers including forest produce collectors. Only a small number of cultivator households were surveyed. The main demographic features of the village have changed little since the 2001 Census.

Table 12: Household survey at Dakshinsol village in 2008			
	Total	Male	Female
Number of households surveyed	15		
Household population	68	34	34
Scheduled caste	43	20	23
Scheduled tribe	3	2	1
Other communities (OBC)	22	12	10
Child population (Age group 0-6)	7		
Number of literates	28		
Number of illiterates	40		
Cultivators	5		
Wage labourers	20		
Other workers including NTFPs collectors	26		
Source: Based on questionnaire survey			



Harinaganj village

The total geographical area of the village is 54.2 hectares including 47.8 hectares of forest area. There are 53 households in the village and the total population of the village is 230 according to the Census 2001.

Table 13: Demographic features of Harinaganj village (Census 2001)

Demographic features	Total	Male	Female
Number of households	53	-	-
Population	230	120	110
Sex ratio	916	-	-
Child population (Age group 0-6)	34	18	16
Scheduled caste	-	-	-
Scheduled tribe	32	13	19
Number of literates	141	92	49
Number of illiterates	89	-	-
Main worker	47	33	14
Marginal workers	72	25	47
Total workers	119	58	61
Non-workers	111	-	-
Cultivators	25	15	10
Agricultural labourers	47	18	29
Household-industry workers	-	-	-
Other workers	47	25	22

Source: Block Development Office, Jamboni, West Midnapur

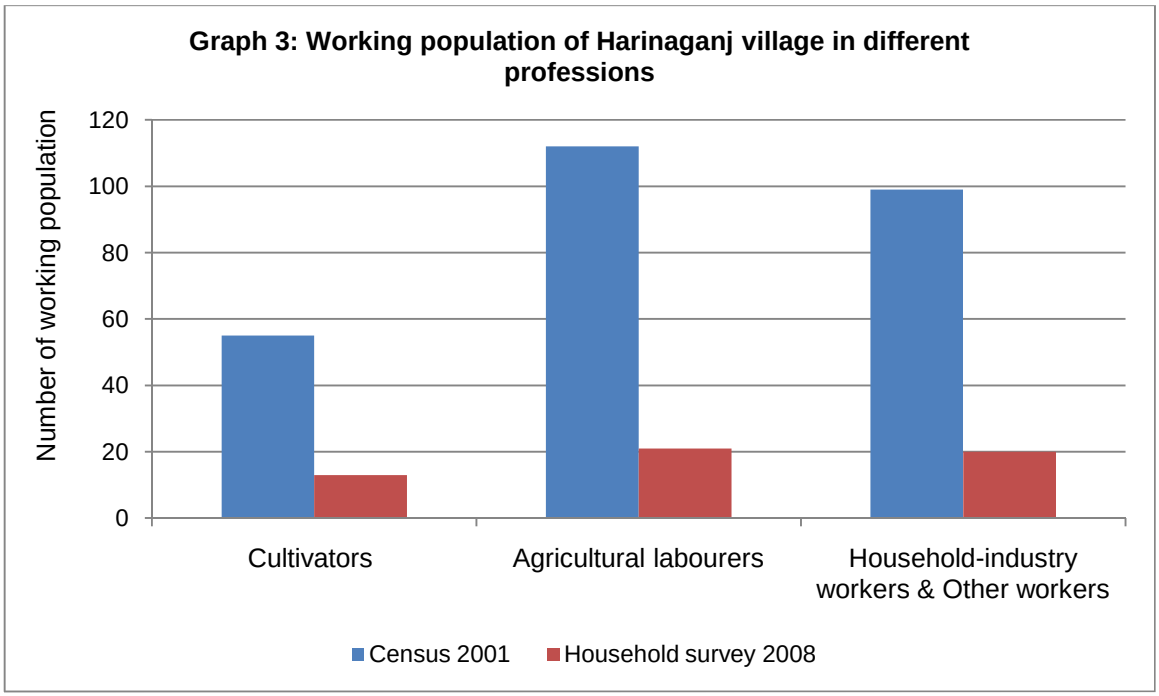
A total of 76 people (35 males, 41 females and 9 children) were participated in the research to share their knowledge and ideas about forestry and their livelihoods.

Table 14: Household survey at Harinaganj village in 2008

	Total	Male	Female
Number of households surveyed	15		
Household population	76	35	41
Scheduled caste	9	6	3
Scheduled tribe	12	4	8
Other communities (OBC)	55	25	30
Child population (Age group 0-6)	9		
Number of literates	34		
Number of illiterates	42		
Cultivators	12		
Wage labourers	20		
Other workers including NTFPs collectors	27		

Source: Based on questionnaire survey

Survey data on the percentage of cultivators, agricultural wage labourers and other workers was very similar to the 2001 Census data.


Graph 3: Working population of Harinaganj village in different professions
Number of working population
120
100
80
60
40
20
0
Cultivators
Agricultural labourers
Household-industry workers & Other workers
Census 2001
Household survey 2008

Kendua village

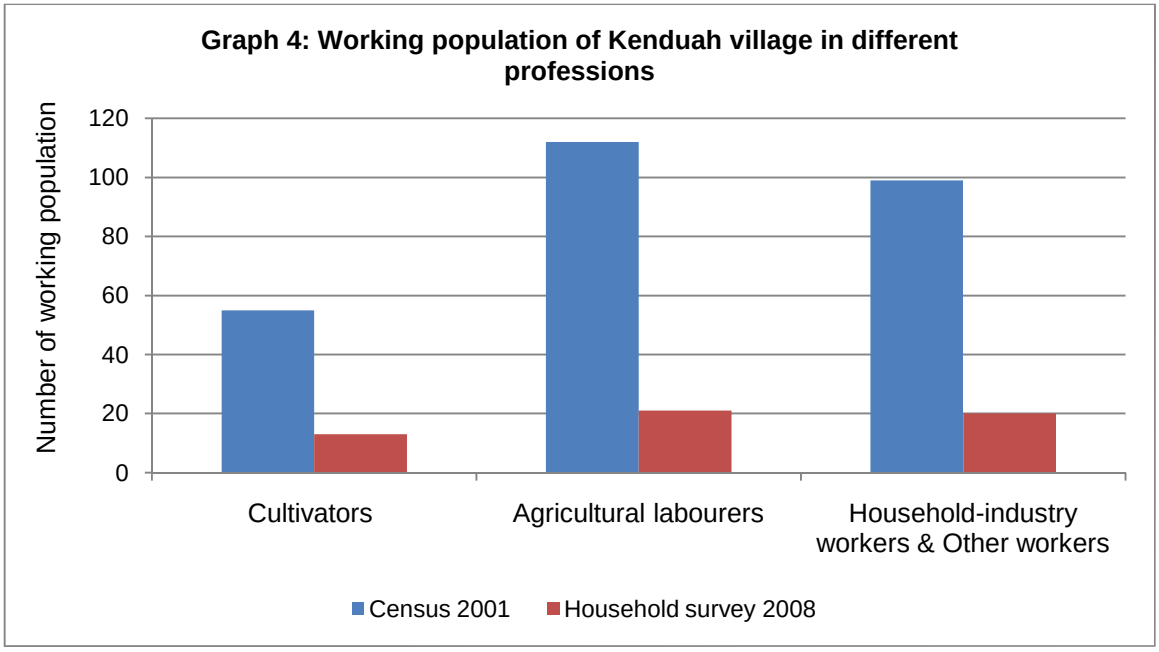
The total area of the Kendua village is 325 hectares including 94 hectares of forest area. There are 117 households in the village. The total population of the village was 534 in 2001.

Table 15: Demographic features of Kendua village (Census 2001)				
Demographic features	Total	Male	Female	%
Number of households	117			
Population	534	266	268	
Sex ratio	1007			
Child population (Age group 0-6)	88	41	47	
Scheduled caste	49	25	24	
Scheduled tribe	177	90	87	
Number of literates	266	152	114	
Number of illiterates	268			
Main workers	124	97	27	
Marginal workers	153	68	85	
Total workers	277	165	112	
Non-workers	257			
Cultivators	67	51	16	
Agricultural labourers	95	47	48	
Household-industry workers	15	2	13	
Other workers	100	79	21	
Source: Block Development Office, Jamboni, West Midnapur				

Ethnically, Kendua is mixed populated village compared to other two villages with scheduled castes, tribes, other backward classes and general population. Of the total working population most villagers are engaged in agricultural activities. Apart from this some are involved in cottage and small scale industries such as food processing, oil producing, rice making etc.

Table 16: Household survey at Kendua village in 2008			
	Total	Male	Female
Number of households surveyed	15	-	-
Household population	76	39	37
Scheduled caste	30	15	15
Scheduled tribe	12	7	5
Other communities (OBC)	34	17	17
Child population (Age group 0-6)	21	-	-
Number of literates	55	-	-
Number of illiterates	21	-	-
Cultivators	8	-	-
Wage labourers	27	-	-
Other workers including NTFPs collectors	16	-	-
Source: Based on questionnaire survey			

The percentage of cultivators and other workers is almost same for 2001 Census data and the household survey but surprisingly, the number of agricultural wage labourers varies considerably.


Graph 4: Working population of Kenduah village in different professions
Number of working population
120
100
80
60
40
20
0
Cultivators
Agricultural labourers
Household-industry workers & Other workers
Census 2001
Household survey 2008

Shushni village

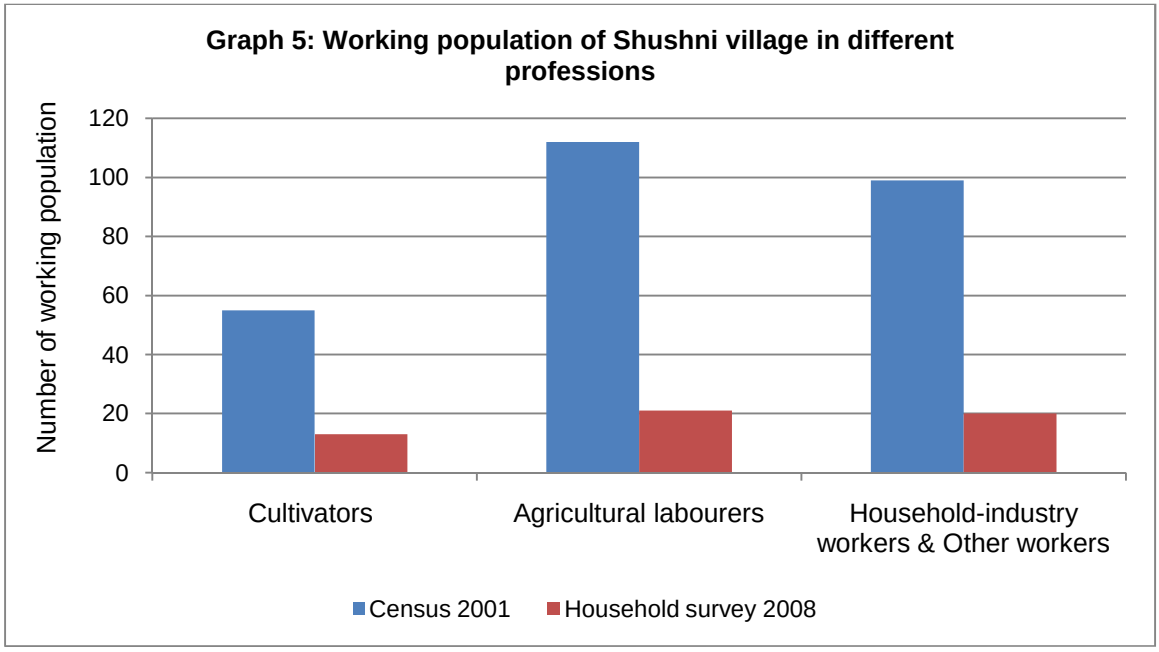
The last study village in the district is Shushni. The total area of the village is 512 hectares including 237 hectares of forest area. The total number of households in the village was 130 in 2001.

Table 17: Demographic features of Shushni village (Census 2001)			
Demographic features	Total	Male	Female
Number of households	130	-	-
Population	594	294	300
Sex ratio	1020	-	-
Child population (Age group 0-6)	102	55	47
Scheduled caste	10	5	5
Scheduled tribe	84	42	42
Number of literates	285	174	111
Number of illiterates	309	-	-
Main workers	77	71	6
Marginal workers	187	97	90
Total workers	266	168	98
Non-workers	330	-	-
Cultivators	55	54	1
Agricultural labourers	112	103	9
Household-industry workers	-	-	-
Other workers	99	12	87
Source: Block Development Office, Jamboni, West Midnapur			

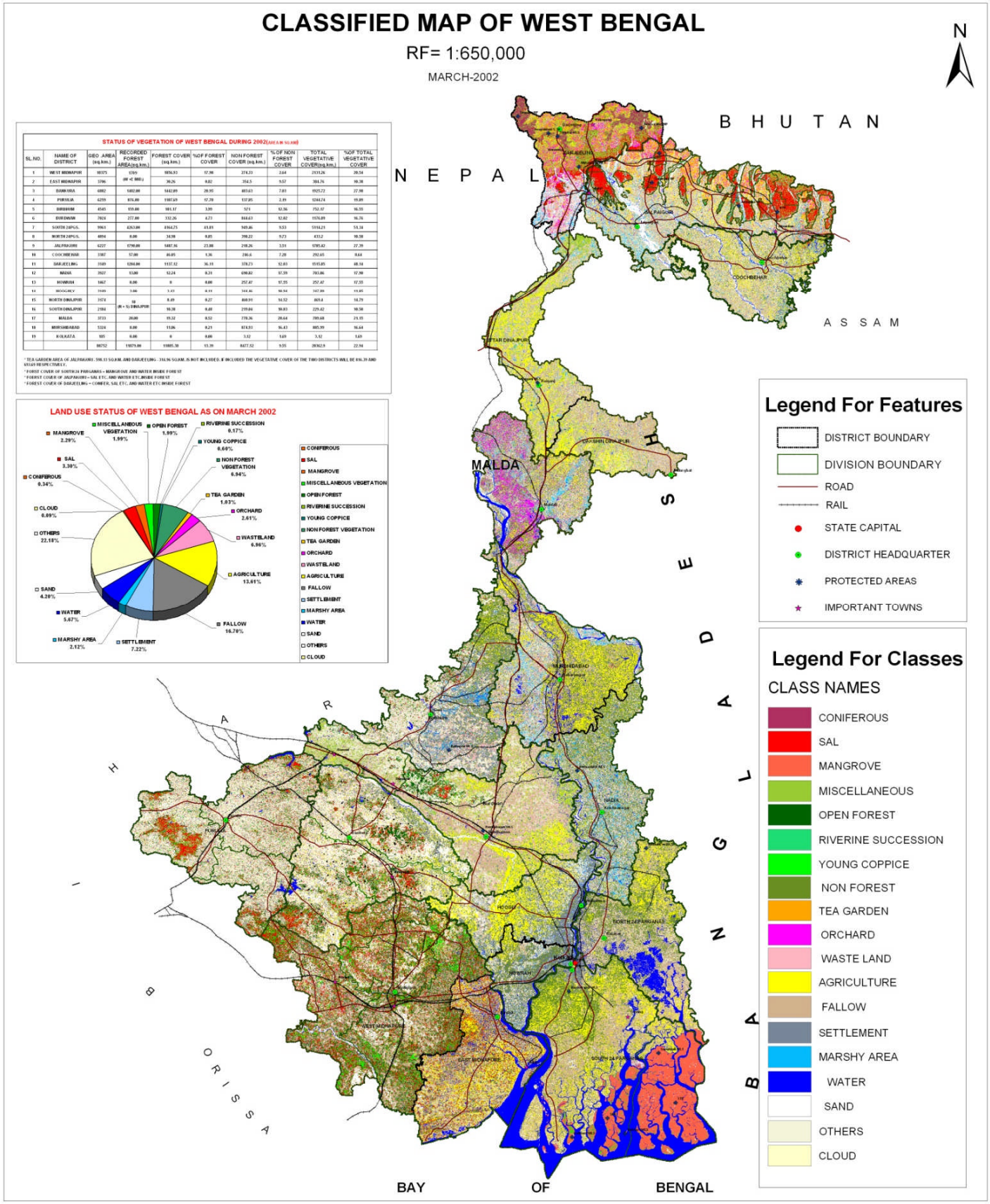
A total of 15 households out of 130 were surveyed and 62 people (35 male and 27 females) participated in the research. The number of Other Backward Class (OBC) families is higher in this village than in the other three. Few households possess their own cultivated land and the per capita agricultural land is also very low.

Table 18: Household survey at Shushni village in 2008			
	Total	Male	Female
Number of households surveyed	15	-	-
Household population	62	35	27
Scheduled caste	-	-	-
Scheduled tribe	11	6	5
Other communities	51	29	22
Child population (Age group 0-6)	6	-	-
Number of literates	35	-	-
Number of illiterates	27	-	-
Cultivators	13	-	-
Wage labourers	21	-	-
Other workers including NTFPs collectors	20	-	-
Source: Based on questionnaire survey			

The economic condition of the village is worse than the other three villages. Most households are living at or below subsistence level. Forest resources are considered important sources of income. However, because of the unsystematic collection of forest products the amount and varieties have been reduced considerably within the last few years.


Graph 5: Working population of Shushni village in different professions
Number of working population
120
100
80
60
40
20
0
Cultivators
Agricultural labourers
Household-industry workers & Other workers
Census 2001
Household survey 2008

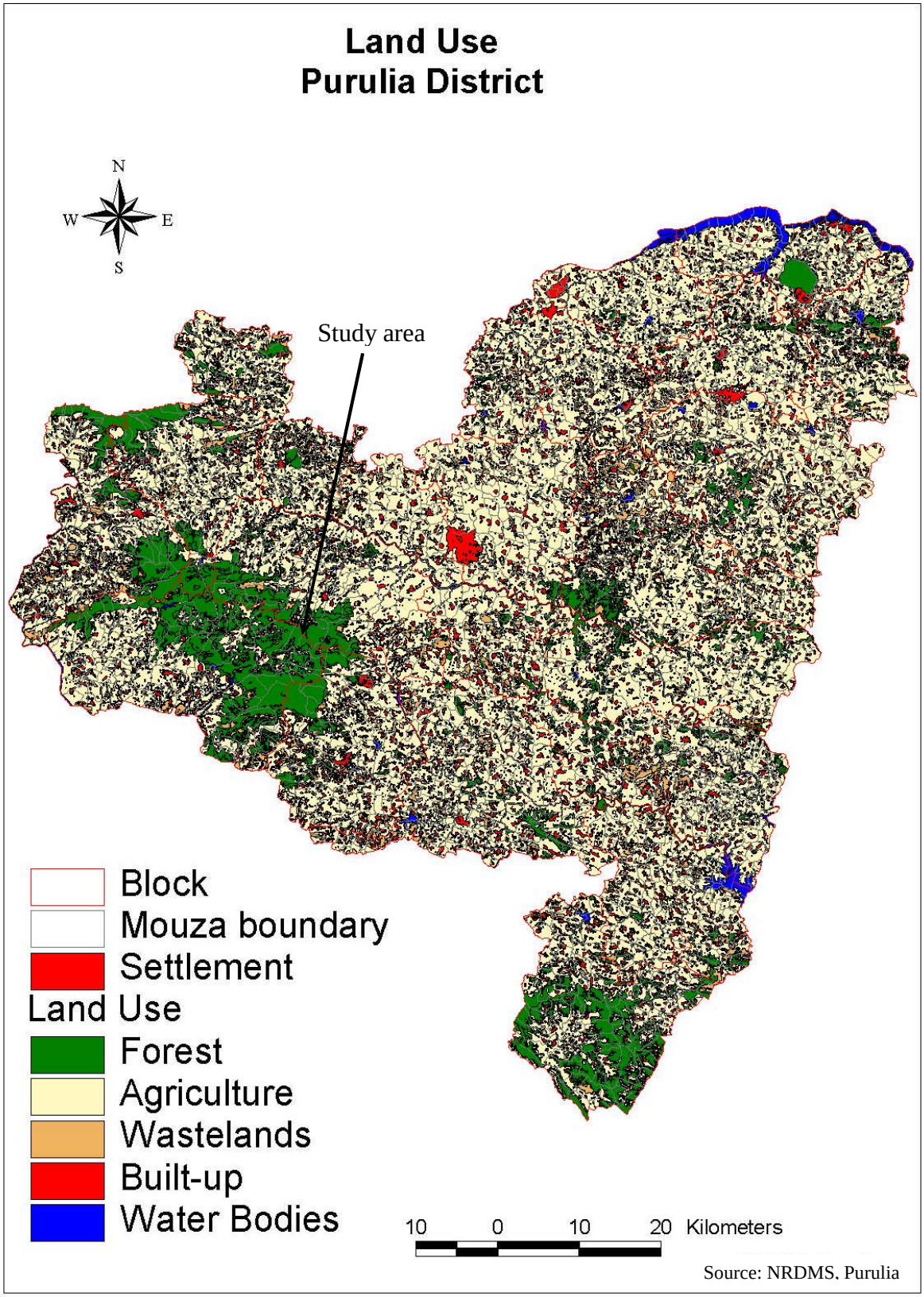
Appendix (5) Maps of the research areas



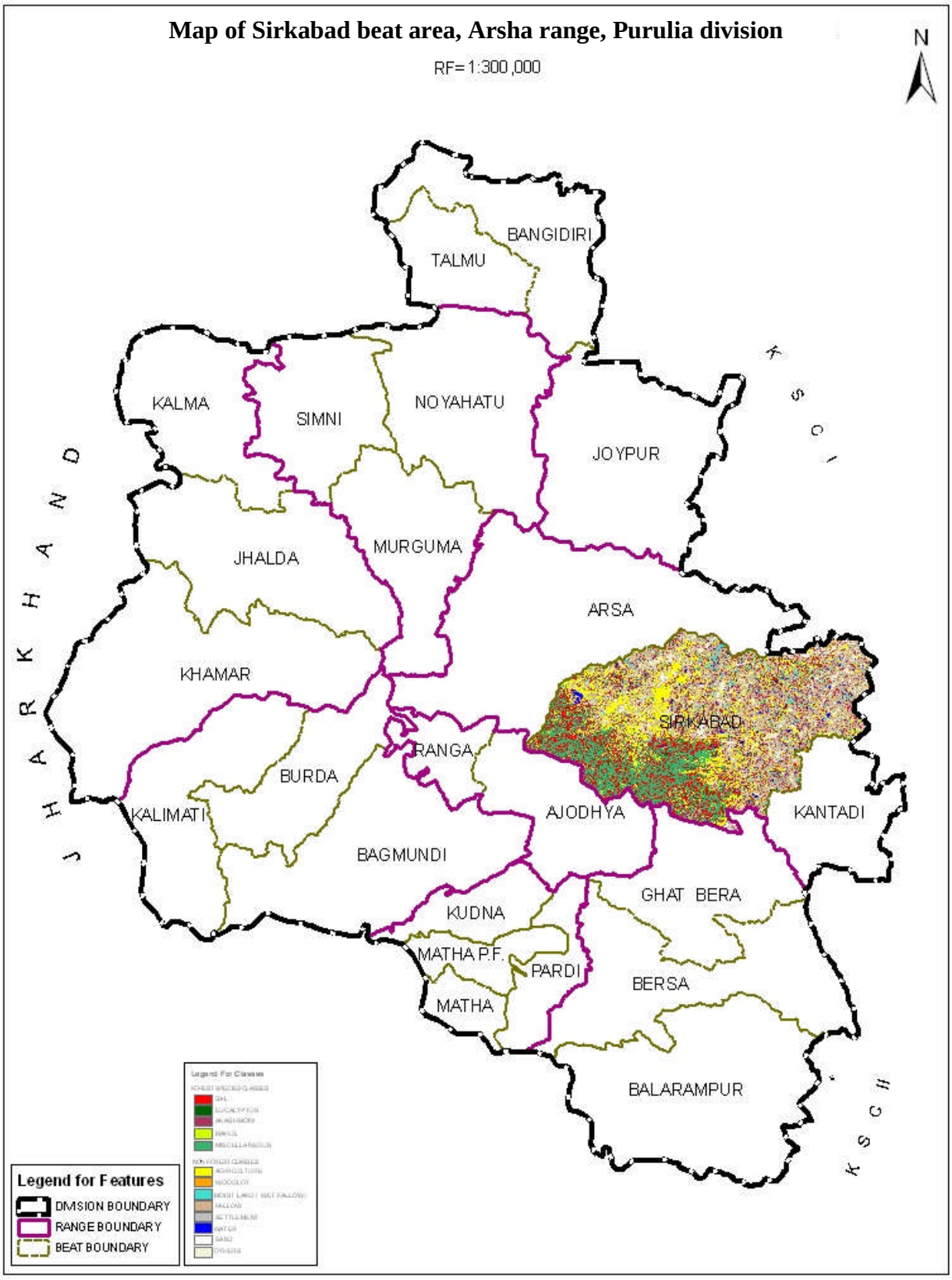
STATUS OF VEGETATION OF WEST BENGAL DURING 2002

SL.NO.	NAME OF DISTRICT	GEO. AREA (sq.km.)	RECORDED FOREST AREA(sq.km.)	FOREST COVER (sq.km.)	%OF FOREST COVER	NON FOREST COVER (sq.km.)	% OF NON FOREST COVER	TOTAL VEGETATIVE COVER(sq.km.)	%OF TOTAL VEGETATIVE COVER
1	WEST MIDNAPUR	9375	5393	5056.93	57.98	274.23	2.64	2331.26	30.54
2	EAST MIDNAPUR	3596	(W + E MID.)	30.26	0.82	354.5	9.57	384.76	10.38
3	BANKURA	6882	5882.00	5442.09	28.95	483.63	7.03	1925.72	27.98
4	PURULIA	6259	876.00	1987.69	57.78	537.95	2.19	5244.74	19.89
5	BIRBHUM	4545	910.00	981.37	3.99	521	12.56	752.37	16.55
6	BURDWAN	7024	277.00	332.26	4.73	844.63	12.02	1176.89	16.76
7	SOUTH 24PGS.	9960	4263.00	4364.75	43.83	949.46	9.53	5314.21	53.34
8	NORTH 24PGS.	4094	0.00	34.98	0.85	398.22	9.73	433.2	10.58
9	JALPAIGURI	6227	5790.00	5887.36	23.88	248.26	3.51	5705.62	27.39
10	COOCHBEHAR	3387	57.00	60.85	1.26	186.6	7.28	292.65	8.64
11	DARJEELING	3149	1284.00	1317.32	36.18	378.23	12.83	1545.85	49.18
12	NADIA	3927	53.00	52.24	0.21	630.82	17.39	783.86	17.39
13	HOWRAH	1467	0.00	0	0.00	252.47	17.55	252.47	17.55
14	HOOGHLY	3149	3.00	3.43	0.11	344.46	10.94	347.89	11.05
15	NORTH DINAJPUR	3374	(N + S) DINAJPUR	0.49	0.27	460.91	14.52	469.4	14.79
16	SOUTH DINAJPUR	2184	90.00	90.00	0.68	219.04	10.03	229.42	10.50
17	MALDA	3733	20.00	93.32	0.52	770.26	20.64	780.68	21.35
18	MURSHIDABAD	5324	0.00	51.06	0.21	874.51	16.43	885.95	16.64
19	KOLKATA	185	0.00	0	0.00	3.32	1.69	3.32	1.69
		88752	31079.00	31885.30	33.39	8477.52	9.55	38362.9	22.34

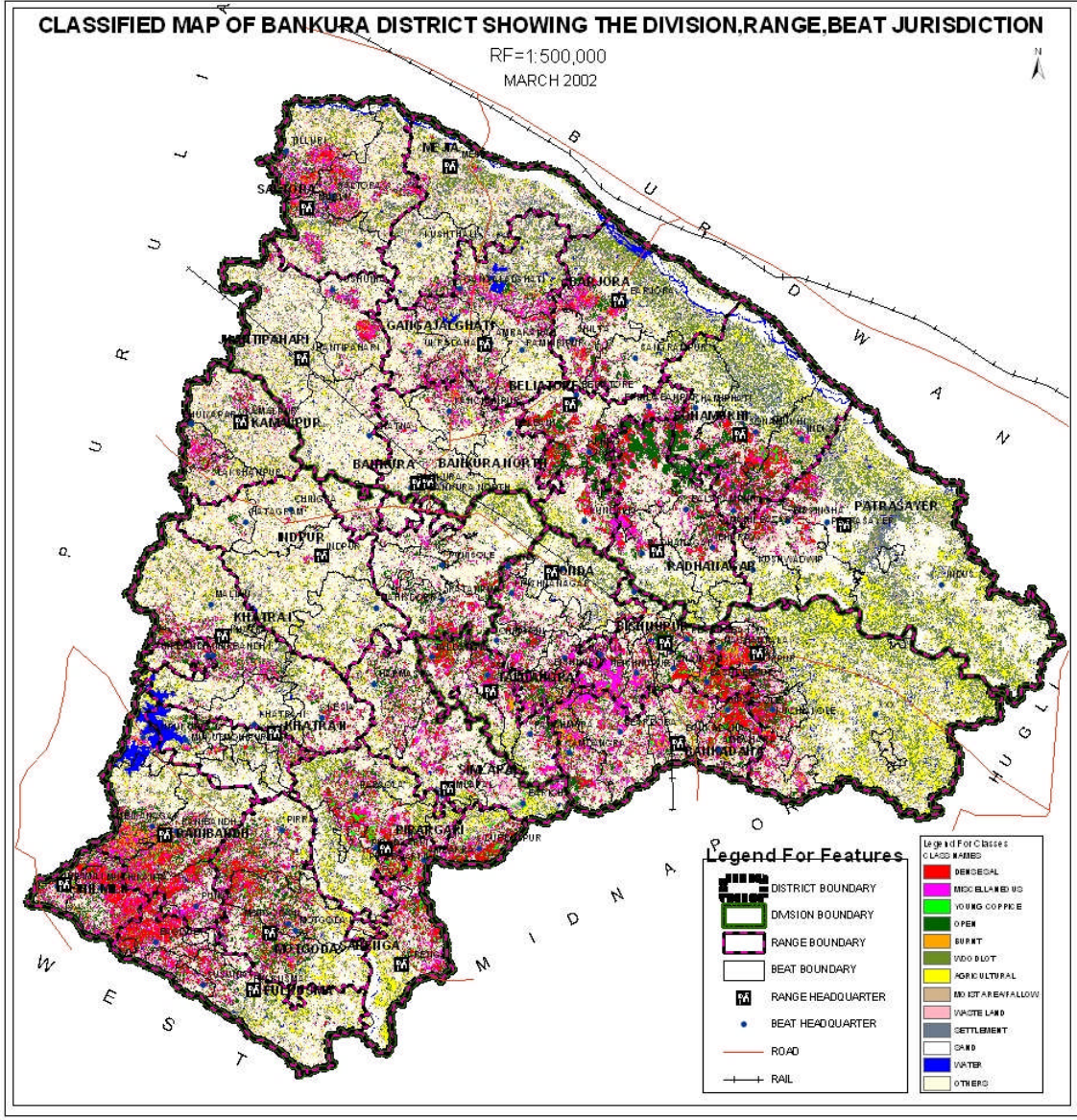
* TEA GARDEN AREA OF JALPAIGURI- 598.33 SQ.KM. AND DARJEELING - 316.96 SQ.KM. IS NOT INCLUDED. IF INCLUDED THE VEGETATIVE COVER OF THE TWO DISTRICTS WILL BE 836.39 AND 1634.9 RESPECTIVELY.
* FOREST COVER OF SOUTH 24 PARGANAS = MANGROVE AND WATER INSIDE FOREST
* FOREST COVER OF JALPAIGURI = SAL ETC. AND WATER ETC.INSIDE FOREST
* FOREST COVER OF DARJEELING = CONIFER, SAL ETC. AND WATER ETC INSIDE FOREST

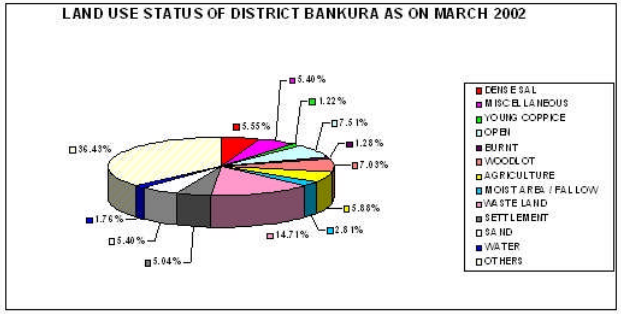

Land Use
Purulia District
N
W
E
S
Study area
Block
Mouza boundary
Settlement
Land Use
Forest
Agriculture
Wastelands
Built-up
Water Bodies
10 0 10 20 Kilometers
Source: NRDMS, Purulia

Map of Sirkabad beat area, Arsha range, Purulia division



Source: Department of Forest, Government of West Bengal





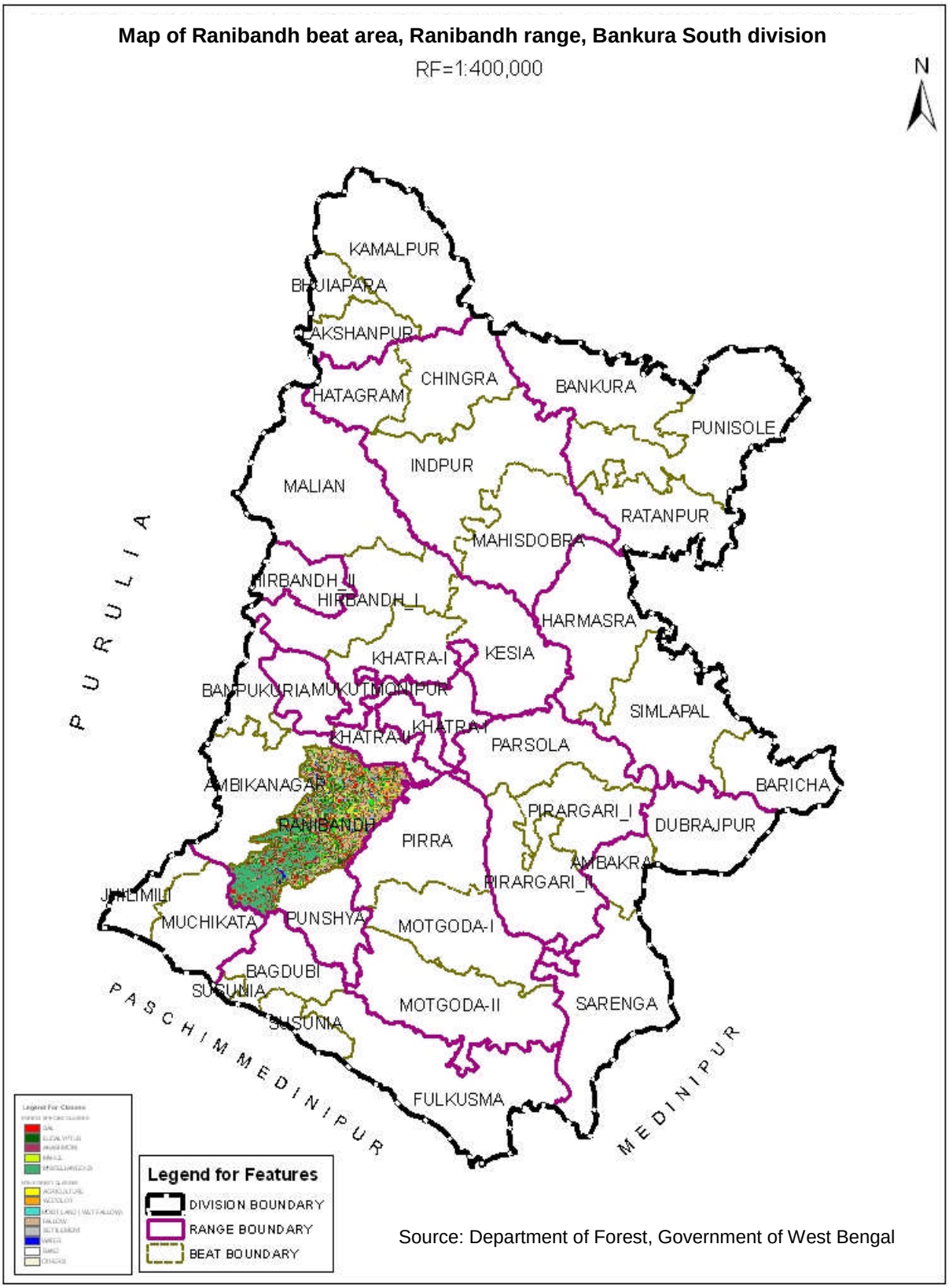
BANKURA

Headquarter:	Bankura
Population:	3.19(in million) } Census, 2001
Population Density:	464 / per sq.km. }
Forest Type:	5B/C1 - Northern Tropical Dry Deciduous Forest(Dry Sal Bearing Forest)
Major Flora:	Sal, Terminalia spp., Haldu, Gamar, *Madhuca latifolia,* Eucalyptus, Akashmoni, Piasal, Kend, Peal etc.
Major Fauna:	Indian Wolf, Indian Fox, Elephant, Fruit bat, Squirrel, Porcupine, Chital,Wild Boar etc.

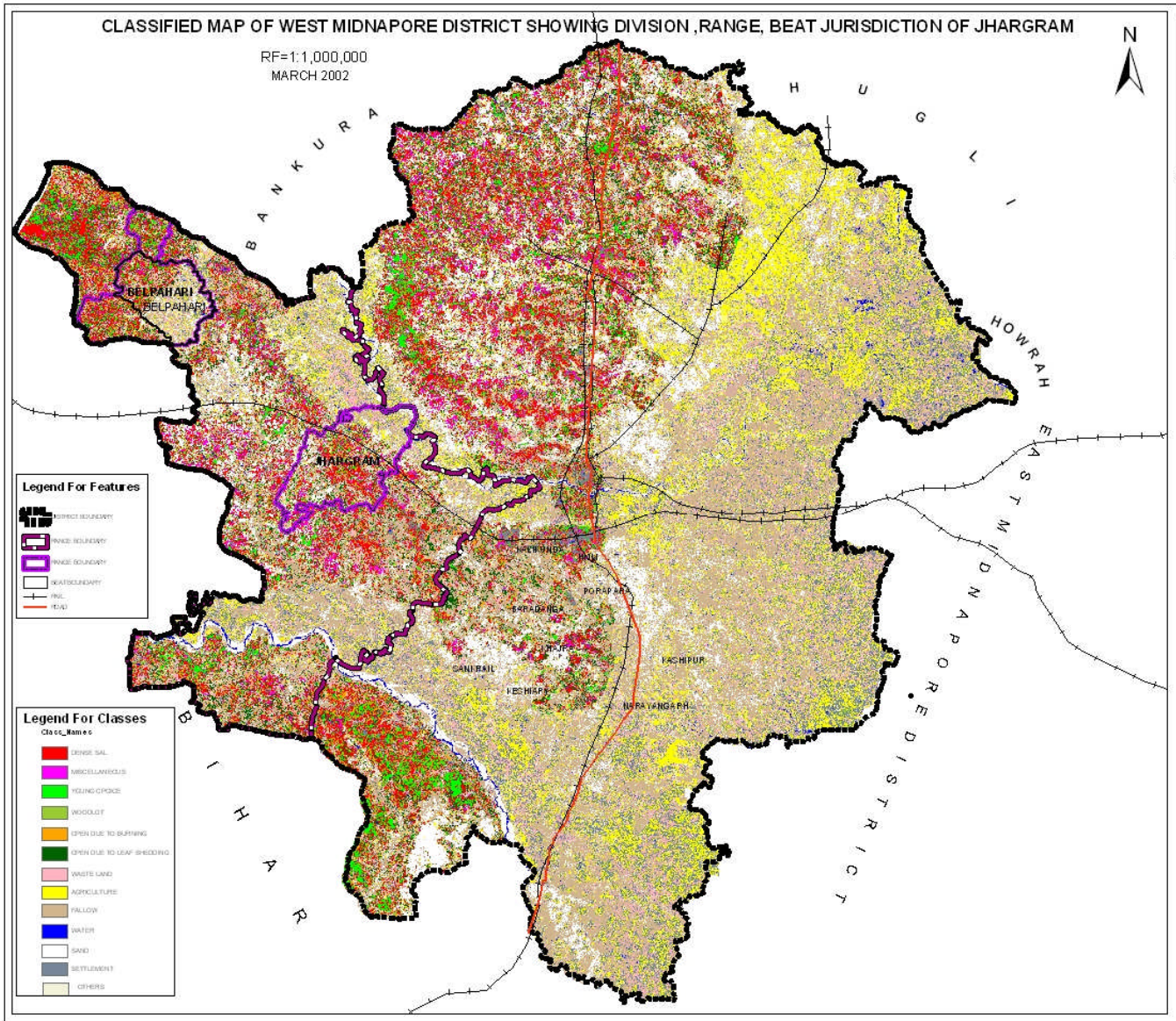
BANKURA		(AREA IN SQ.KMTS.)
1	GEOGRAPHICAL AREA	6882
2	FOREST COVER	1442.09
3	% OF FOREST COVER	20.96
4	NON FOREST COVER	483.63
5	TOTAL VEGETATIVE COVER	1925.72
6	% OF TOTAL VEGETATIVE COVER	27.98

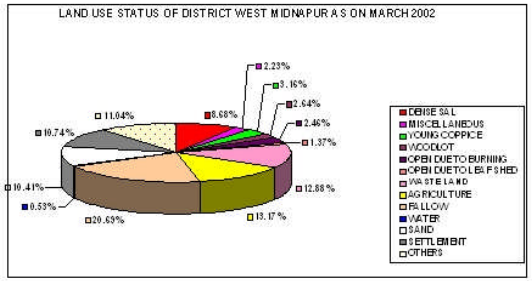
Map of Ranibandh beat area, Ranibandh range, Bankura South division

RF=1:400,000



Source: Department of Forest, Government of West Bengal



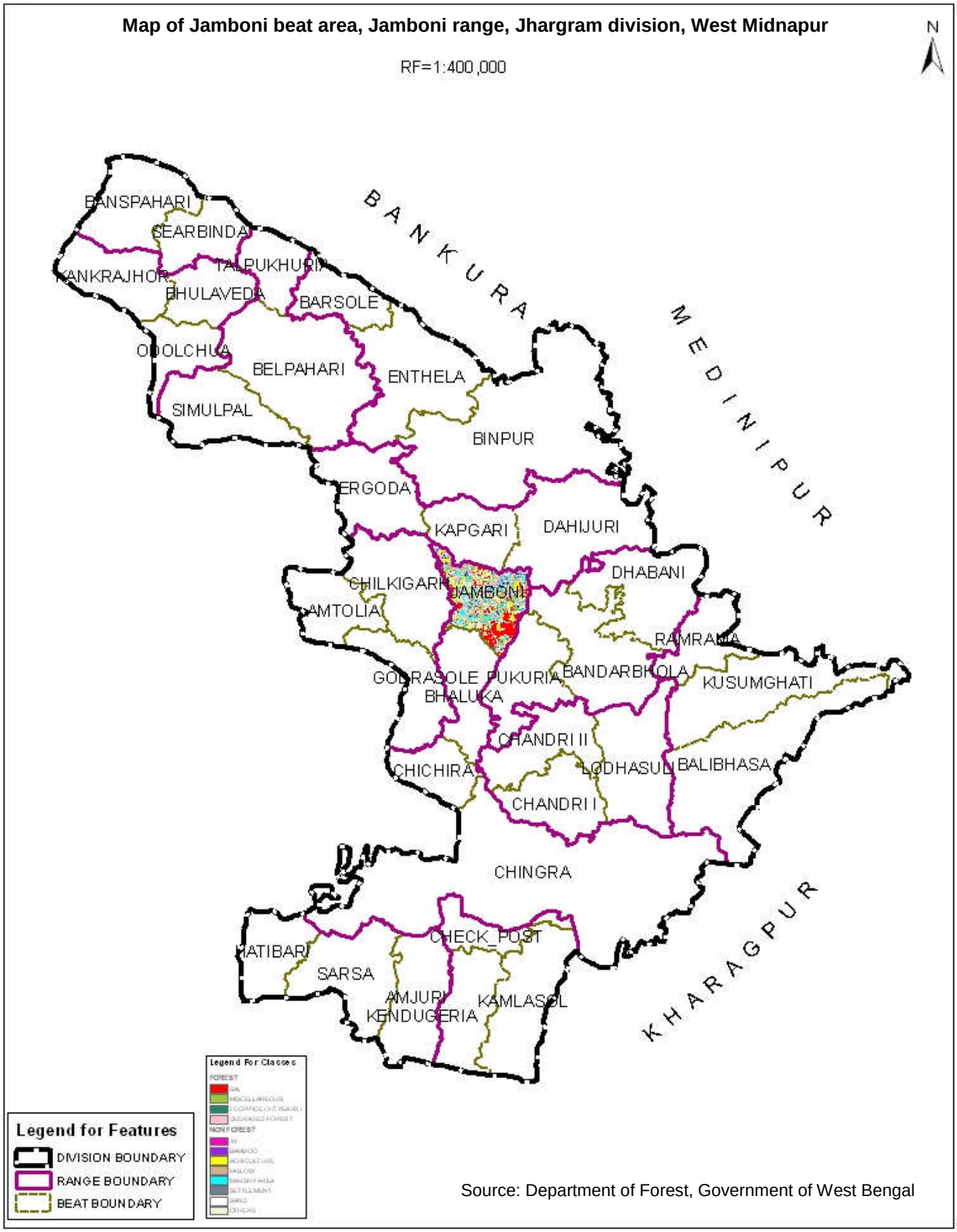


WEST MIDNAPUR

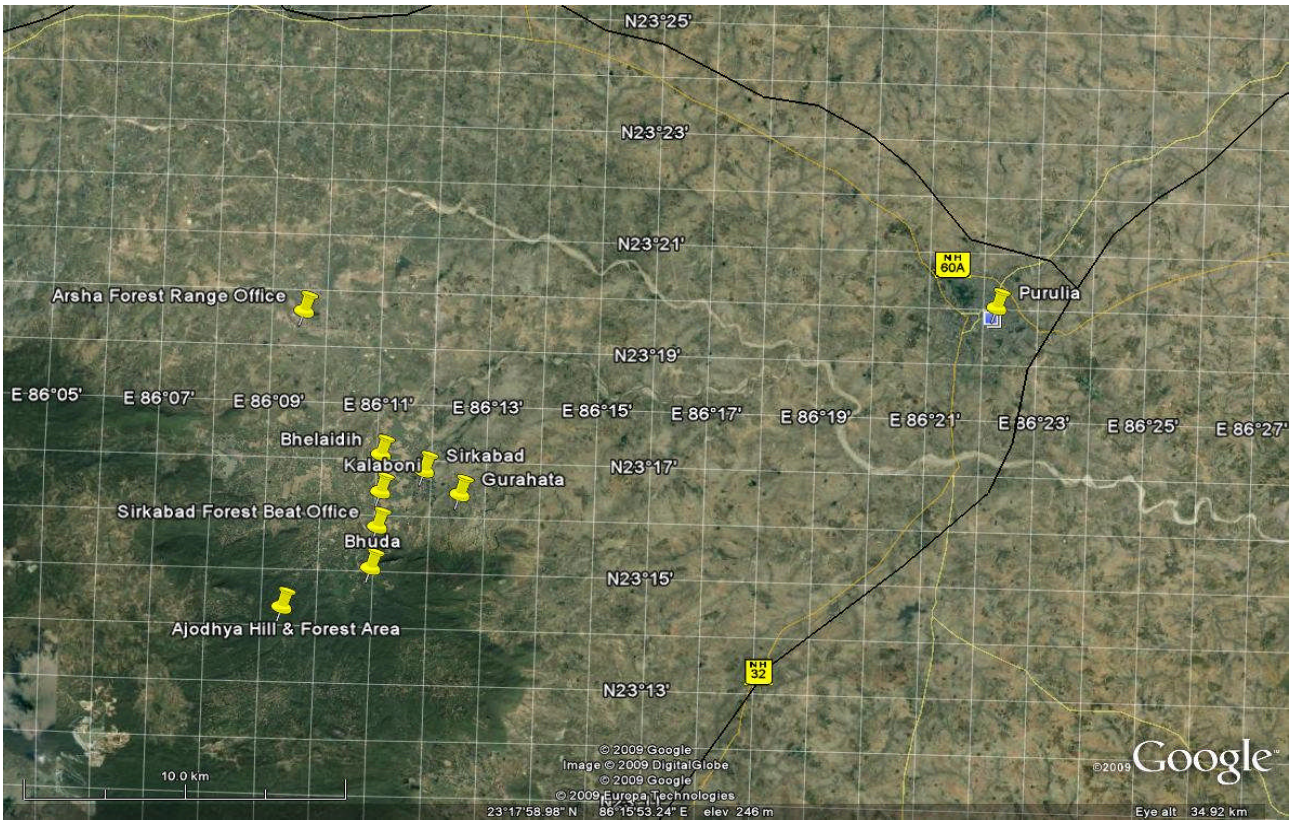
Headquarter:	Midnapur
Population:	9.64 (in million) } Census, 2001
Population Density:	685 / per sq.km } Population of undivided Midnapur District.
Forest Type:	5B/C1 - Northern Tropical Dry Deciduous Forest
Major Flora:	Sal, Terminalia spp., Haldu, Gamar, Madhuca Latifolia, Kend, Peal, Peasal, Eucalyptus, Akashmani, Bamboo, Kaju (Planted species) etc.
Major Fauna:	Indian Wolf, Indian Fox, Elephant, Fruit bat, Squirrel, Porcupine etc.

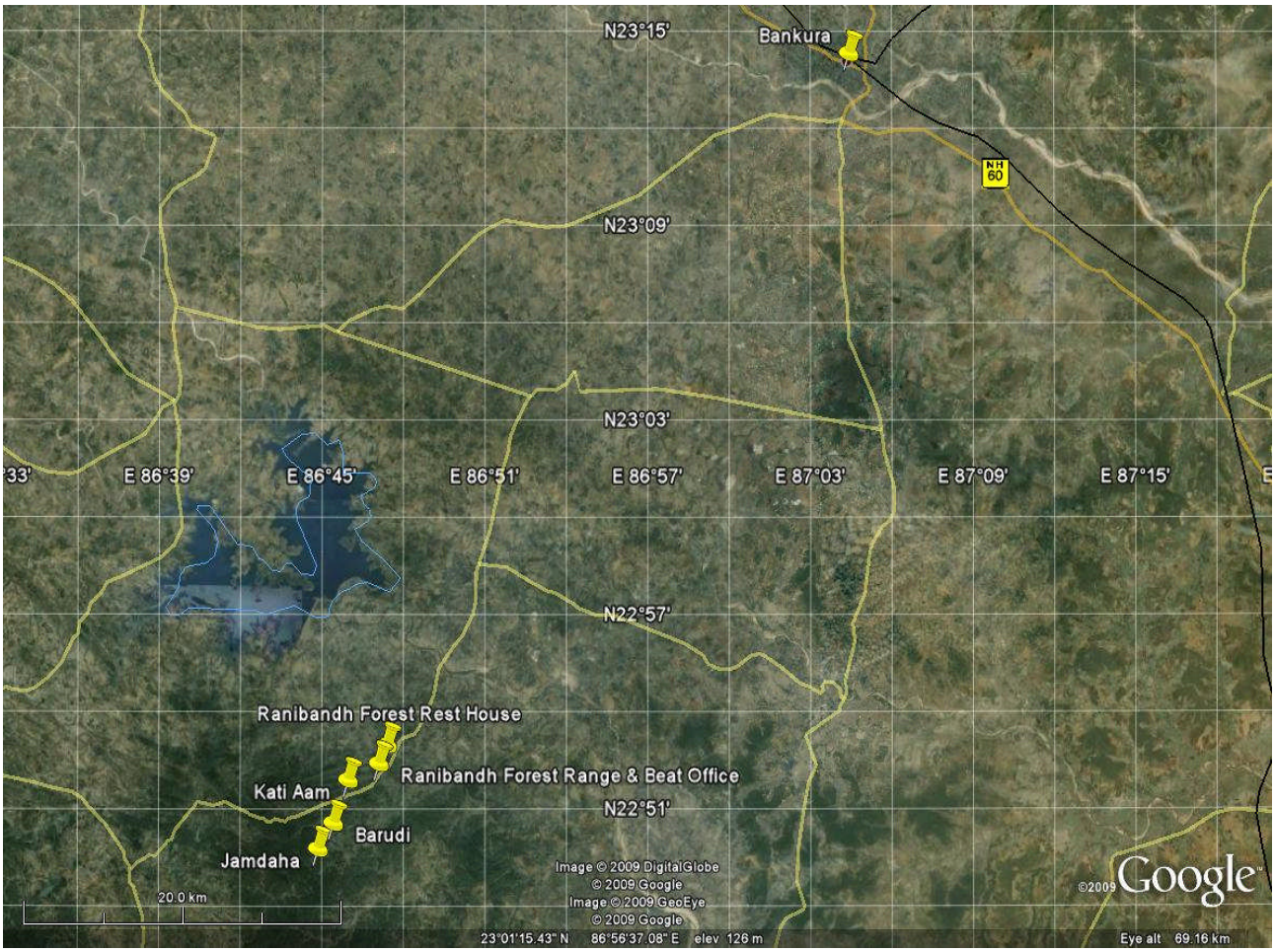
WEST MIDNAPUR (AREA IN SQ.KMTS)		
1	GEOGRAPHICAL AREA	10375
2	FOREST COVER	1856.93
3	% OF FOREST COVER	17.9
4	NON FOREST COVER	274.33
5	TOTAL VEGETATIVE COVER	2131.26
6	% OF TOTAL VEGETATIVE COVER	20.54

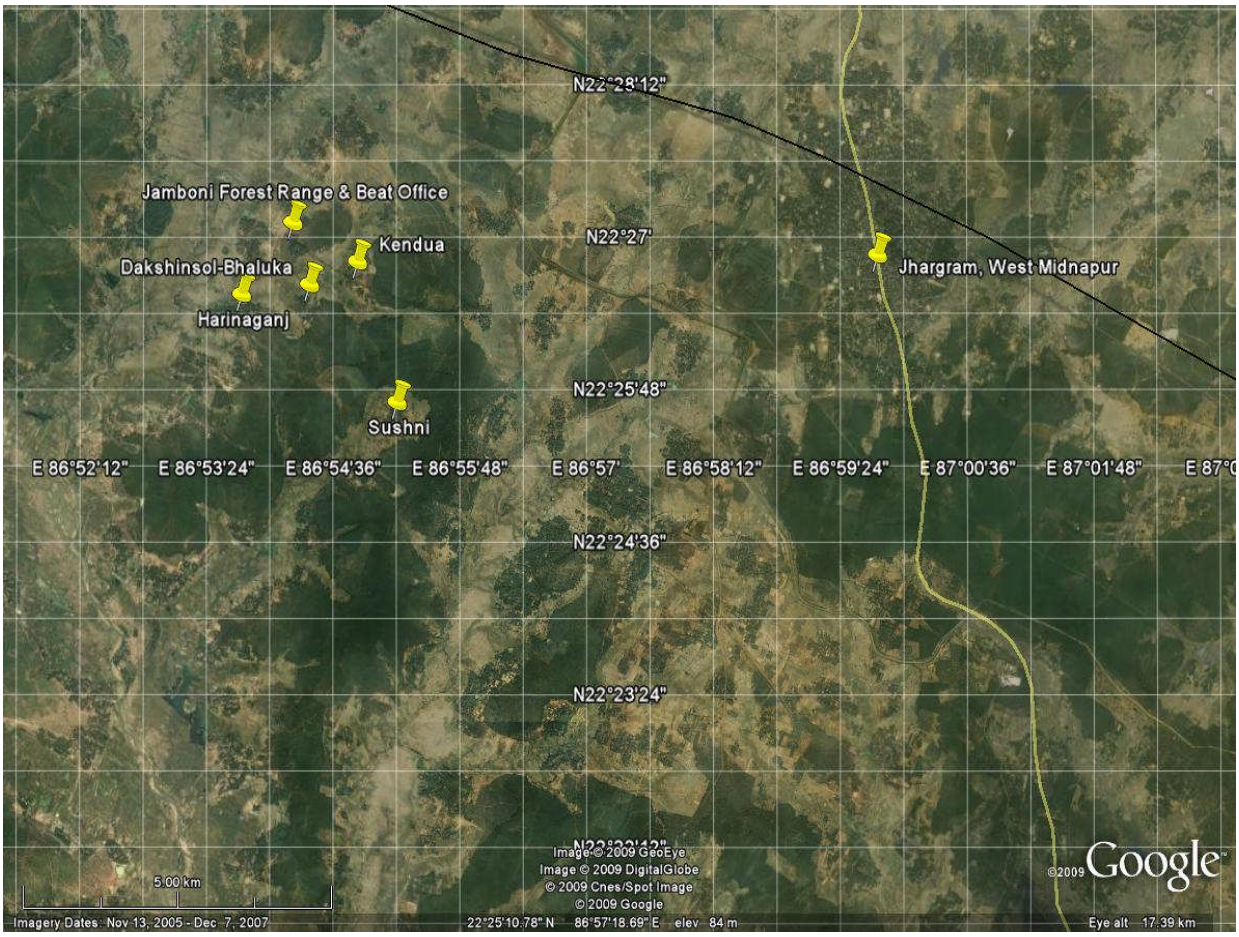
Map of Jamboni beat area, Jamboni range, Jhargram division, West Midnapur



Source: Department of Forest, Government of West Bengal


N23°25'
N23°23'
N23°21'
N23°19'
N23°17'
N23°15'
N23°13'
E 86°05'
E 86°07'
E 86°09'
E 86°11'
E 86°13'
E 86°15'
E 86°17'
E 86°19'
E 86°21'
E 86°23'
E 86°25'
E 86°27'
NH 60A
NH 32
Purulia
Arsha Forest Range Office
Bhelaidih
Kalaboni
Sirkabad
Gurahata
Sirkabad Forest Beat Office
Bhuda
Ajodhya Hill & Forest Area
10.0 km
© 2009 Google
Image © 2009 DigitalGlobe
© 2009 Google
© 2009 Europa Technologies
23°17'58.98" N 86°15'53.24" E elev 246 m
Eye alt 34.92 km
©2009 Google


N23°15'
N23°09'
N23°03'
N22°57'
N22°51'
E 86°39'
E 86°45'
E 86°51'
E 86°57'
E 87°03'
E 87°09'
E 87°15'
NH 60
Bankura
Ranibandh Forest Rest House
Ranibandh Forest Range & Beat Office
Kati Aam
Barudi
Jamdaha
20.0 km
Image © 2009 DigitalGlobe
© 2009 Google
Image © 2009 GeoEye
© 2009 Google
23°01'15.43" N 86°56'37.08" E elev 126 m
Eye alt 69.16 km
©2009 Google



Google map of Purulia, Bankura and West Midnapur districts